

# **LO LOG DATA LOGGER**



## **USER MANUAL**

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Keep this record in the front of the User Manual. When the document has been amended write the amendment number, the date, the paragraph numbers affected by the amendment and your initials in the table below.

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## **WARNINGS AND CAUTIONS**

### **WARNING**

The Lo Log Data Logger contains Lithium-ion batteries. The used batteries must be disposed of in accordance with Local Environmental Regulations.

Radcom Technologies Ltd offers the service of equipment and battery disposal.

## TABLE OF CONTENTS

	<b>TITLE</b>	<b>PAGE</b>
1	Abbreviations and Definitions.....	1
2	Introduction.....	2
3	The Lo Log Data Logger .....	3
4	Applications .....	6
5	Lo Log Installation .....	7
5.1	Positioning.....	7
5.2	Connections .....	7
6	Logger Operation .....	8
6.1	Analogue Inputs .....	8
6.2	Digital Inputs .....	8
7	RadWin Lite Software .....	9
7.1	General.....	9
7.2	Installation .....	9
8	Initial Configuration .....	10
8.1	Database Path Configuration .....	10
8.2	Communication Port Configuration .....	11
9	Communicating with the Lo Log Data Logger.....	13
10	How To Configure the Lo Log Data Logger using RadWin Lite.....	14
11	Downloading Data from the Lo Log Data Logger.....	27
12	Graph and Data Table Manipulation .....	32
12.1	Selecting the Input Channel Data to be viewed.....	33
12.2	Changing the Information in the Data Table .....	34
12.3	Changing the Graph Style.....	35
13	Lo Log Vista Display Options .....	38
13.1	Analogue Channels.....	42
13.2	Digital Channels .....	47
	Annex A – Connection Details .....	51
	Annex B – Troubleshooting .....	54
	Annex C – Lo Log Calibration.....	55
C1.	Logger Calibration.....	55
C2.	Re-Zero .....	60
C3.	Check Calibration.....	62
	Annex D – Instantaneous Values of the Logger Input.....	64
	Annex E – Meter Types .....	68

## TABLE OF FIGURES

Figure 1 – Lo Log Data Logger Connected to Portable Device .....	5
Figure 2 – Lo Log Data Logger Connections .....	7
Figure 3 – Lo Log LL and LL Vista Data Logger Connections .....	7
Figure 4 – System Configuration Screen.....	10
Figure 5 – Communication Port Configuration .....	12
Figure 6 – Communicating with the Logger using the Infra-Red Reader .....	13
Figure 7 – Logger Type Selection Screen .....	14
Figure 8 – Current Logger Connection Type Screen .....	15
Figure 9 – Analyse Logger Screen .....	16
Figure 10 – Logger Zone and Location Identity Screen .....	17
Figure 11 – Zone and Location File Select Screen .....	18
Figure 12 – Installed Logger Connection Type Screen .....	19
Figure 13 – Channel 01 Configuration Screen .....	20
Figure 14 – Transducer Configuration Screen .....	21
Figure 15 – Channel 02 Configuration Screen .....	22
Figure 16 – Logger Sample Rate Screen .....	23
Figure 17 – Logger Recording Time Screen .....	24
Figure 18 – Upload Logger Screen .....	25
Figure 19 – Configure Logger Wizard Finished Screen .....	26
Figure 20 – Download Data Screen .....	28
Figure 21 – Data Filename Screen.....	29
Figure 22 – Store Data Screen.....	30
Figure 23 – Download Data Wizard Finished Screen .....	31
Figure 24 – Radwin Lite Data Graph Screen .....	32
Figure 25 – Channel Selection Toolbar.....	33
Figure 26 – Selecting the Table Data Format .....	34
Figure 27 – Selecting the Graph Format .....	36
Figure 28 – Manual Download/Upload Screen.....	39
Figure 29 – Lo-Log Flash Parameter Screen .....	40
Figure 30 – Display Configuration Channel Select.....	41
Figure 31 – Display Configuration Display Values .....	43
Figure 32 – Min/Max Options .....	45
Figure 33 – Last Full Time Window Settings.....	46

Figure 34 – Meter Reading Field .....	48
Figure 35 – Upload Parameters Screen .....	49
Figure A1 – Digital Flow Input Circuit .....	52
Figure A2 – MilliAmp Input Circuit .....	53
Figure C1 – Advanced Download/Upload/Utilities Screen .....	56
Figure C2 – Calibrate Logger, Utilities Tab, Advanced Download/Upload/Utilities .....	56
Figure C3 – Downloading Header Screen .....	57
Figure C4 – Low Value, Calibrate Logger Screen .....	58
Figure C5 – High Value, Calibrate Logger Screen .....	58
Figure C6 – Calibration Options Screen .....	59
Figure C7 – Re-Zero Logger, Utilities Tab, Advanced Download/Upload/Utilities .....	60
Figure C8 – Re-Zero Logger Screen .....	61
Figure C9 – Re-Zero Options Screen .....	61
Figure C10 – Check Calibration, Utilities Tab, Advanced Download/Upload/Utilities .....	62
Figure C11 – Check Calibration Screen .....	63
Figure D1 – Advanced Download/Upload/Utilities Screen .....	65
Figure D2 – Instantaneous Values, Utilities Tab, Advanced Download/Upload/Utilities .....	65
Figure D3 – Instantaneous Value Screen .....	66

## TABLE OF TABLES

Table 1 – Lo Log Data Loggers .....	4
Table 2 – Lo Log Ordering Matrices .....	5
Table 3 – Table Data Format Options .....	35
Table 4 – Graph Format Options .....	37
Table 5 – Units per Pulse Values .....	42
Table 6 – Lo Log LL Vista Display Options .....	44
Table 7 – Litres per Pulse Values.....	47
Table A1 – Cable Details for Lo Log Data Logger.....	51
Table A2 – 4 Pin Connector Type 62GB57A-10-4 .....	51
Table A3 – Pin Connector Type 62GB57A-10-4 .....	52
Table B1 – Trouble Shooting Guide .....	54



## 1 Abbreviations and Definitions

BAUD RATE	Measurement of Data speed between instruments using serial communication
DMA	District Metering Area
LAN	Local Area Network
PDA	Personal Digital Assistant
PIT	Pulse Interval Time (Event Mode)
RADLINK	Keypad unit for setting Radcom Loggers & Downloading data
RADLOG FOR WINDOWS	Industry standard software for data trending, reporting, analysing and archiving
RADWIN (LITE)	Simple Radwin Software for configuring Data Loggers
RAM	Random Access Memory
WAN	Wide Area Network

## **2 Introduction**

This manual has been produced as an Informative User Guide to the Lo Log range of Data Loggers, designed and manufactured by Radcom Technologies Ltd.

The manual provides an introduction to the data loggers, presenting the essential information required for the user to gain a clear understanding of the equipment and its uses.

The manual includes an overview of the Lo Log, including:

- Physical Construction
- Functional Operations
- User Applications.

and contains instructions on how to:

- Install the Hardware
- Obtain and install the necessary Software
- Configure the Lo Log with the Software
- Interact with the Lo Log to gain the data required.

### **3 The Lo Log Data Logger**

The Lo Log Data Loggers are designed as low cost, compact, rugged industrial data logging units and incorporate the latest technology and data compression techniques.

The Lo Log Data Loggers are used for the monitoring of water distribution pipe networks and leakage reduction.

The Lo Log has recently been further developed to include Flash Technology. Further firmware upgrades can be transferred through the communications port, without physically opening the logger.

The Lo Log Data Logger can be supplied with up to two inputs to monitor digital and/or analogue signals with the option of a digital read-out. The loggers have a powder coated, die-cast aluminium enclosure that is waterproof and submersible to IP68. The logger is battery powered with a battery life of around 8 years.

Communication with the logger is achieved using a magnetic, infrared reader connected by a RS232 communications port to a PDA, Laptop or Desktop PC.

All of Radcom's Data Loggers and Controllers are compatible with RadLog for Windows, the industry standard software for data trending, reporting, analysing and archiving.





Main features of the Lo Log Flash Data Logger include:

- Stores data from sensors with pulse outputs, pressure sensors or 4-20 mA.
- Stores 16,000 readings, expandable to 32,000 (approx 5 to 10 months at 15 min sampling rate).
- Variable sample rate of 1 second to 24 hours.
- Minimum battery life of 5 years, typically 8 years, under normal operation and advance warning of battery exhaustion.
- Count and Event logging modes.
- 16 character text comment field and can store up to 127 characters of text.
- Infrared interface operates at 9600 baud.

The Lo Log Data Logger is available in different configurations (see Table 1) and can be ordered by using the ordering matrices shown in Table 2.

Figure 1 shows a Lo Log Data Logger connected to a portable device transferring data between them.

**Table 1 – Lo Log Data Loggers**

Lo Log Type	Series	Image	Input Channel Options	Case Size	Manual Download
Lo Log	RDL 400		1 Channel 'Flow'	Small Case	Infra-Red Reader Port
Lo Log	RDL 400		1 Channel 'Pressure'	Small Case	Infra-Red Reader Port
Lo Log LL	RDL 500		1 to 2 Channels 'Flow' and/or 'Pressure'	Middle Case with Handle	Infra-Red Reader Port
Lo Log LL Vista	RDL 500/V		1 to 2 Channels 'Flow' and/or 'Pressure'	Middle Case with Handle and LCD Display	Infra-Red Reader



**Figure 1 – Lo Log Data Logger Connected to Portable Device**

The Lo Log Data Logger can be ordered using the following matrices:

**Table 2 – Lo Log Ordering Matrices**

R	D	L	4	1		LF	/		
					1= 1 input		4= Digital i/p military connector 6= Internal Pressure Sensor		

R	D	L	5	1		L	/	i/p 1	i/p 2
					1= 1 input 2= 2 inputs		0= no input 2= 0-1 volt input 3= external pressure 4= digital pulse 5= 4-20mA 6= internal pressure		

## **4 Applications**

Radcom battery powered data loggers and controllers are operating in countries worldwide. They are being used in the monitoring and reporting of flow, level and water quality in Potable Water and Environmental applications.

Lo Log can be connected to either a digital input to monitor flow meter pulses or an analogue input to monitor pressure and is designed for the following Potable Water Applications:

- District Metering Areas (DMA) and General Flow Logging
- Demand Managements Assessments
- Customer Metering Diagnostics.

## 5 Lo Log Installation

### 5.1 Positioning

Although the logger is waterproof and submersible to IP68, it is recommended that the logger be positioned inside a pit/chamber and out of the water to allow for easier access.

### 5.2 Connections

The Lo Log Data Logger can be supplied in various configurations for connection to different types of input sources. Figure 2 and Figure 3 detail common connections to Lo Log loggers.



**Figure 2 – Lo Log Data Logger Connections**



**Figure 3 – Lo Log LL and LL Vista Data Logger Connections**

Refer to Annex A for detailed information about Pin Configuration and Input Circuitry.

#### Notes

For sites subject to large pressure surges it is recommended that a snubber be used between the logger and pressure point.

## **6 Logger Operation**

### **6.1 Analogue Inputs**

The logger samples the analogue input every second and stores the average value over the logging/recording interval for each channel.

### **6.2 Digital Inputs**

The logger can record the digital flow data either by counting pulses, up to 64 pulses per second, during the sampling period or by measuring the pulse interval time (PIT). Data recorded using PIT (Event mode) gives a higher resolution of data readings compared to the counting pulse method. The logger can be configured to record in either count pulse or event mode (PIT).

It is recommended that event mode should only be used when the pulse rate is less than 2Hz; otherwise the logger register will overflow resulting in negative numbers being stored in the memory.

The maximum input frequency for the digital input is limited to 64Hz. The minimum pulse width of the input pulses must be more than 8 milliseconds.

Single flow input records data in both directions from bi-directional flow meters. The logger uses a flow direction signal present on the 4-pin flow connector. The flow meter must be configured to output pulses on the flow input, and the status signal to the direction input of the logger.

Dual flow input loggers record data in single direction only.



## **7 RadWin Lite Software**

### **7.1 General**

Radwin Lite is a simple to use, cut down version, of Radcom's Radlog for Windows software. It allows data to be configured and downloaded using wizards, and provides basic graphing functionality, data statistics and data export.

#### **Note**

An easy-to-use Help Menu is opened by default and contains all the necessary information to operate the software.

It will be necessary to specify where data is to be stored, and the communication ports that are to be used for communicating with the loggers. Radwin Lite stores all logger information in a database. This database is compatible with "Radlog for Windows", allowing Radwin Lite to be upgraded to the full "Radlog for Windows" software if required.

RadWin Light software can either be downloaded directly from the Radcom website ([www.radcom.co.uk](http://www.radcom.co.uk)), e-mailed, or provided on disc from the address on the front page.

The Minimum Hardware Requirements for installing the software are:

- IBM PC or compatible
- Hard Disk                                      20 Mb
- CD Drive                                        8 Mb
- Environment                                  Microsoft Windows 3.1, 3.11 (32 bit Software), '95, '98 or NT (32 bit Software)
- PC Comms Port                                Serial.

Certain communications procedures supported by the software require the following item:

- Radcom Data Logger with suitable PC connection.

### **7.2 Installation**

To install the Radwin Lite software, proceed as follows;

1. Open the e-mail, downloaded file or cd file.
2. Click on the 'SETUP' icon.
3. Click 'SAVE; to save to the default location or choose the required path.

The software will automatically install and the Radwin Lite program will open to allow logger configuration.

## 8 Initial Configuration

As an initial activity, the associated Database Path and Communications Port configuration must be carried out as described below.

It is important that the software is correctly configured before running the program for the first time. This ensures that the Database Path and Communication Ports are correct, as well as establishing the required file structure.

After the installation of the Radwin Lite Software select **Basic Configuration** from the Configuration drop down menu.

### 8.1 Database Path Configuration

The Database Path configuration options are displayed on the **System** tab of the **System Configuration** screen (see Figure 4).

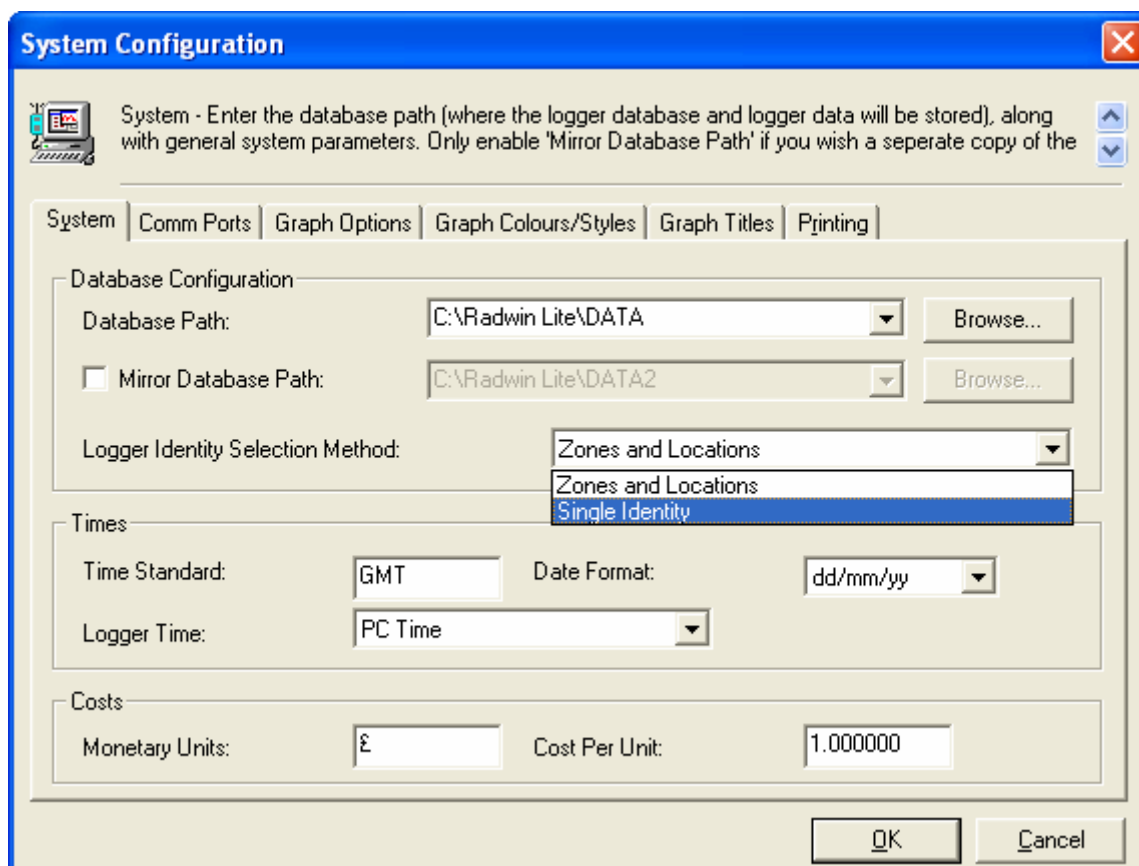


Figure 4 – System Configuration Screen

The default location for this database is in folder 'c:\Radwin Lite\Data'. The operator may change the database folder location to suit the network needs, especially if the database is shared with other users on the local network.

The method of selecting loggers from the database can also be specified here. The options are:

- Single Identity – Each logger is displayed as a single 7 digit identity for selection, or
- Zones and Location – Breaks the logger identity into 2 components, a zone and a location. This method requires 2 selections to be made to select a location, firstly the zone, and then the location. This selection method is useful for grouping loggers, where all loggers in a DMA are specified under the same zone. The zone is taken to be the first 4 digits and the location the last 3 digits of the logger's identity. The database path specifies where the logger database will be stored, and where the software will look to find its data files.

The logger selection is chosen from the **Logger Identity Selection Method** drop-down menu.

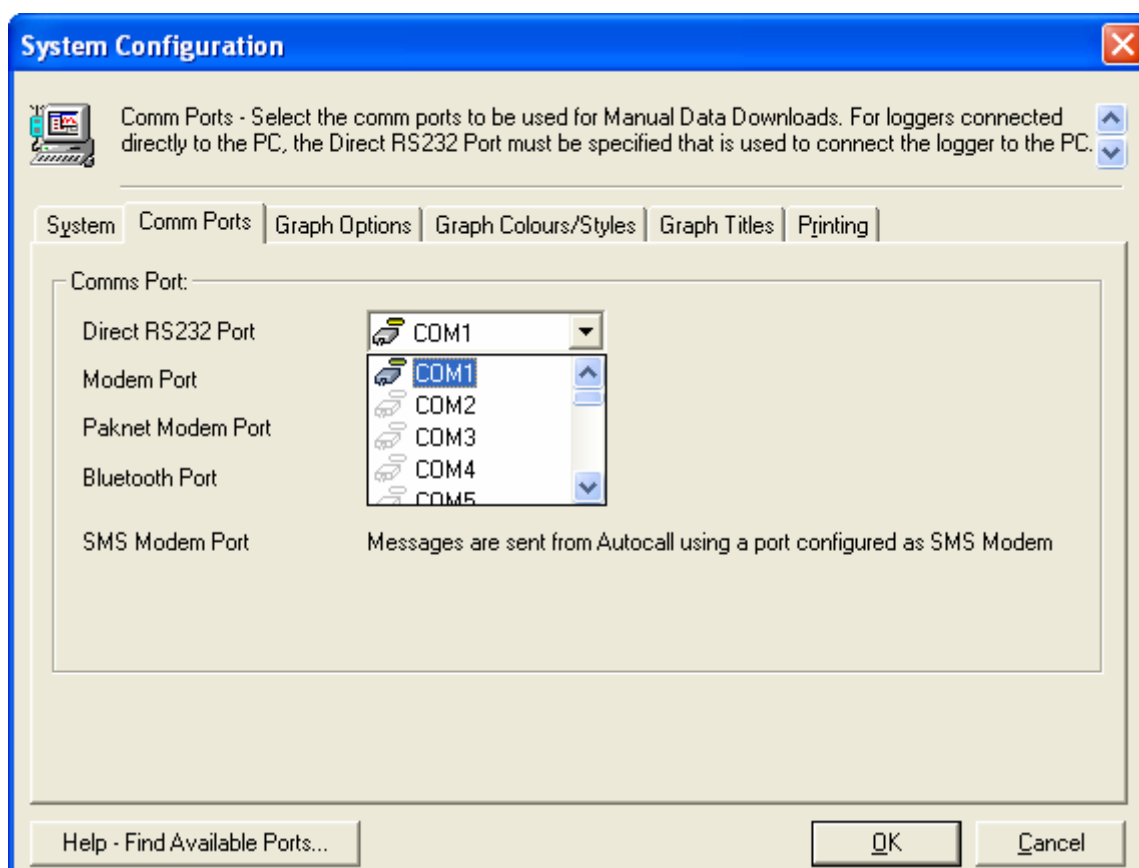
#### **Note**

The numbering system used for the identity of loggers should be planned before commissioning of the loggers commences, so re-configuring is not required in the future as the number of loggers in the system expands. The identity selection method within the software is not as important, as this setting can be changed at any time to change the way locations are selected.

## **8.2 Communication Port Configuration**

The Communication Port configuration options are found under the **Comm Ports** tab of the **System Configuration** screen (see Figure 5).

This option allows the user to select the communication ports for manually communicating with the loggers connected directly to the PC. The **Direct RS232 Port** drop-down menu must be used to connect the logger to the PC.



**Figure 5 – Communication Port Configuration**

After completing the Database Path and Communication Port configurations, click on the **OK** button at the bottom of the **System Configuration** screen.

## 9 Communicating with the Lo Log Data Logger

Apart from the inputs, there are no external electrical connections to the Lo Log Data logger and all communications with the outside world are accomplished through a small circular window in the top of the unit (see Figure 6). Using a magnetic infrared reading head, set-up parameters can be *uploaded* and recorded data *downloaded* by direct connection to a RS232 communications port on a Desktop PC or Portable Device running the appropriate Radcom software.


The infrared reader is positioned in the 'target' on top of the Lo Log Logger.



Figure 6 – Communicating with the Logger using the Infra-Red Reader

## 10 How To Configure the Lo Log Data Logger using RadWin Lite

The Lo Log logger can be easily configured using the **Configure Logger Wizard** included in the Radwin Lite software.

Select the wizard from the **Download Options** drop-down menu or the wizard icon  on the title page. Proceed after each option by clicking on the **Next** button.

### Note

- 1) An easy-to-use Help Menu is opened by default and contains all the necessary information to operate the software.
- 2) All of the configuration information can be seen on the left side of the screen of the **Configuration Summary** box of the Configure Logger Wizard screen (See Figure 7).

### Logger Type

What type of Logger do you wish to configure?

Select *Lo Log Flash* from the **Logger Type** drop-down menu. If you are unsure of the type of logger you are using, click on the **Auto Detect** button (see Figure 7).

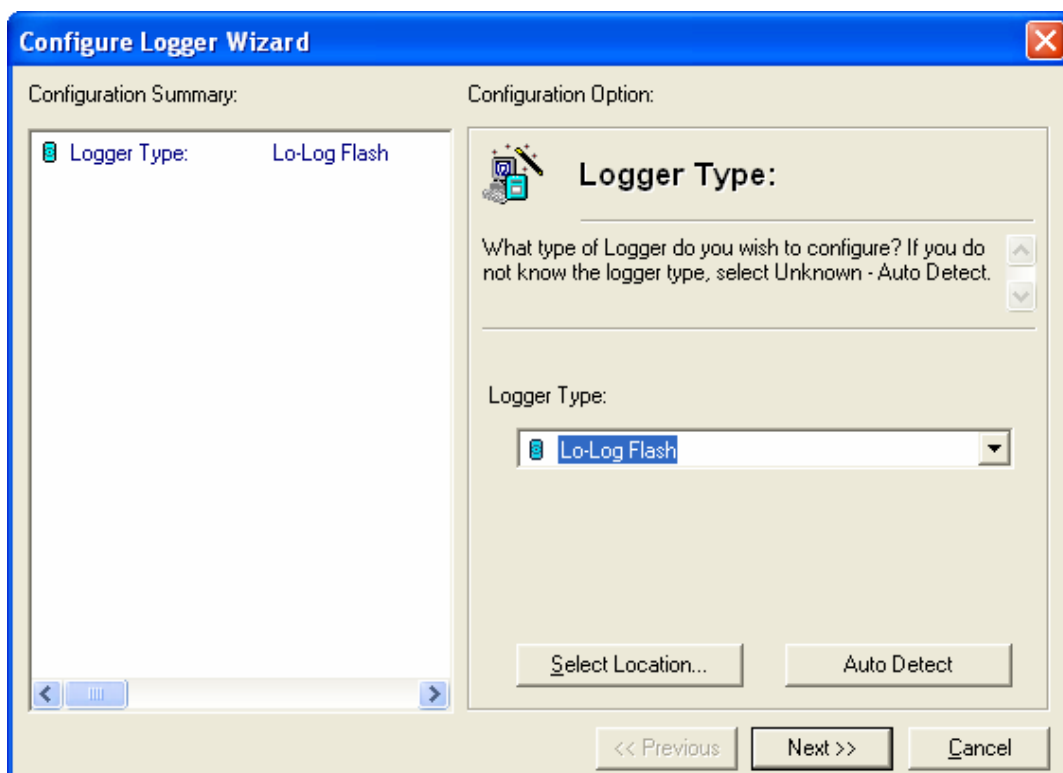


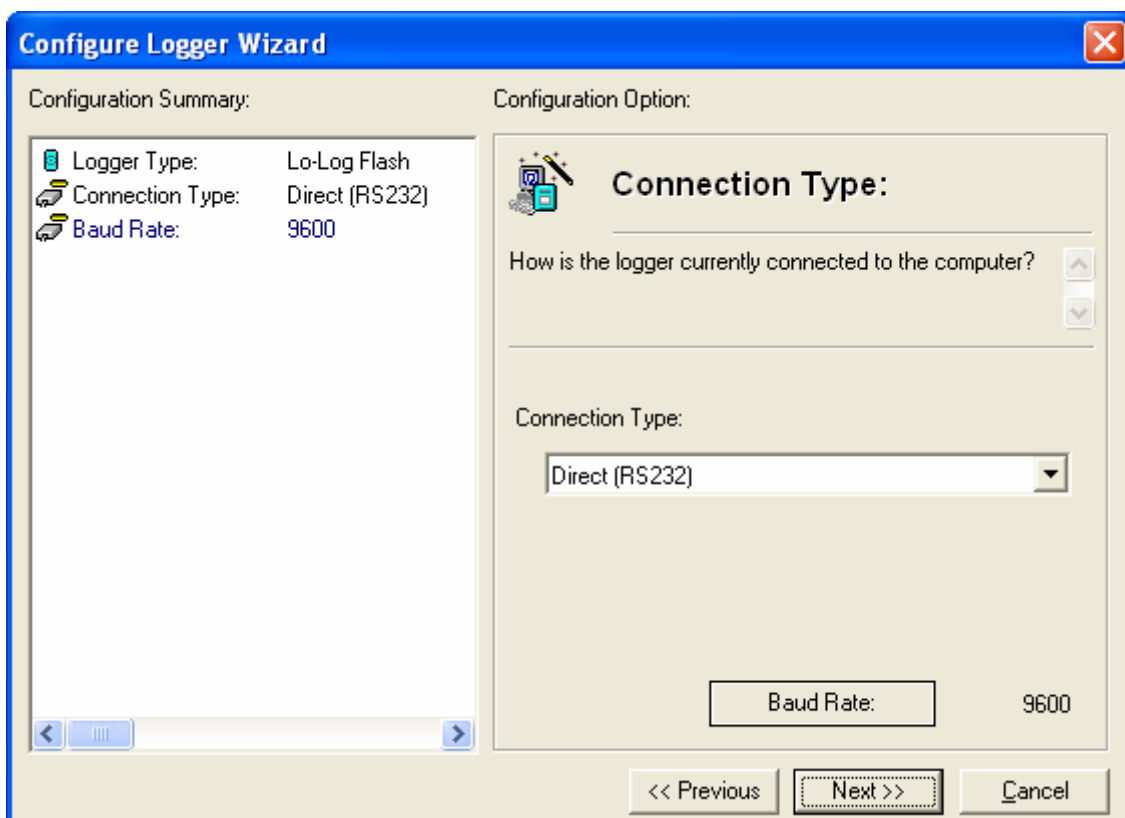
Figure 7 – Logger Type Selection Screen

If the logger already exists in the database and requires reconfiguring, click on the **Select Location** button to select the Zone and Location of the Logger from the database.

### Connection Type

How is the logger currently connected to the computer?

At the **Connection Type** field (see Figure 8), select *Direct RS232* from the **Connection Type** drop-down menu.



**Figure 8 – Current Logger Connection Type Screen**

### Baud Rate

What baud rate should be used to talk to the logger?

At the **Baud Rate** field (see Figure 8), select the appropriate baud rate from the drop-down menu options. The default rate of 9600 is correct for the Lo Log Logger.

## Analyse Logger

The current logger parameters will now be downloaded. If the download fails, check the logger is connected to the computer as specified and the connection configuration is correct.

Click the **Next** button (see Figure 9) for the software to download the logger parameters.

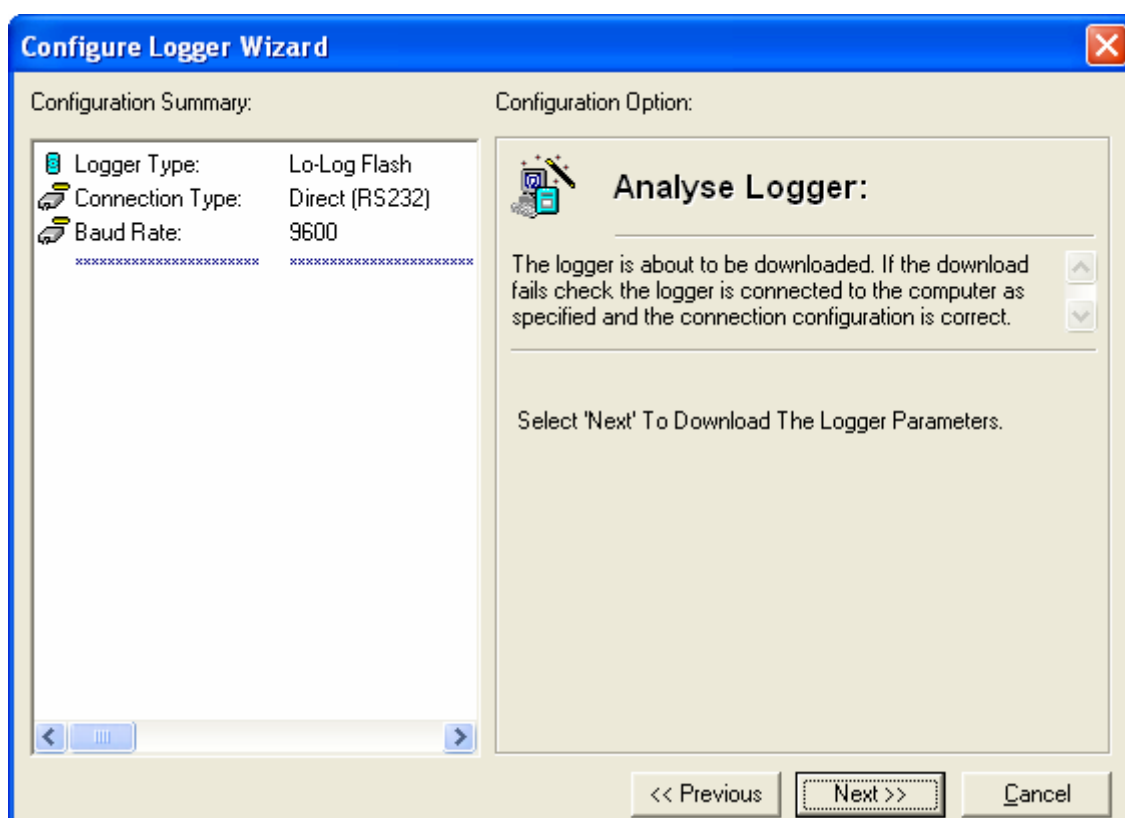
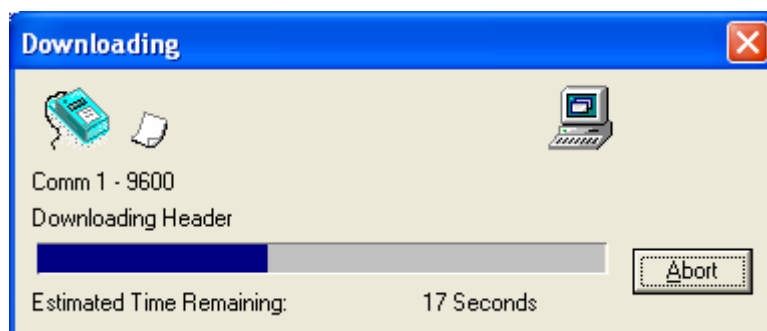


Figure 9 – Analyse Logger Screen



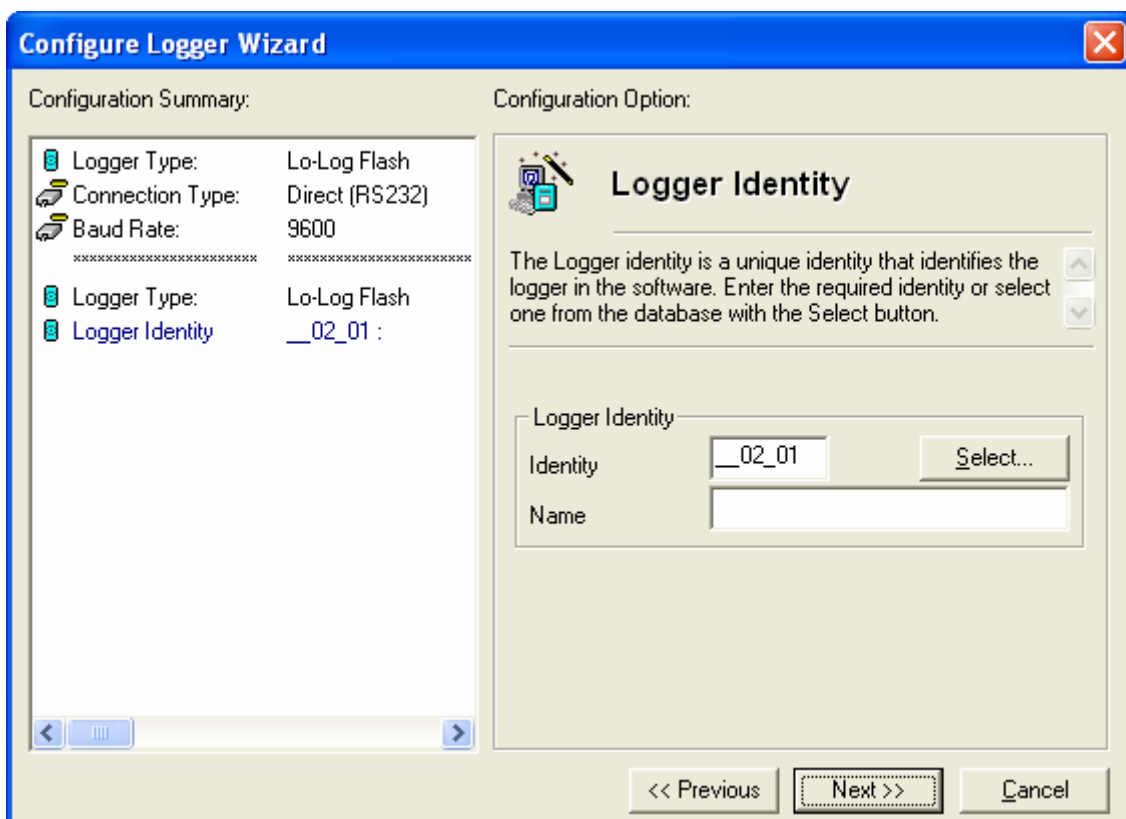
The above screen will now appear to show the Logger Parameters are being *downloaded*.



### Logger Identity (Zone and Location)

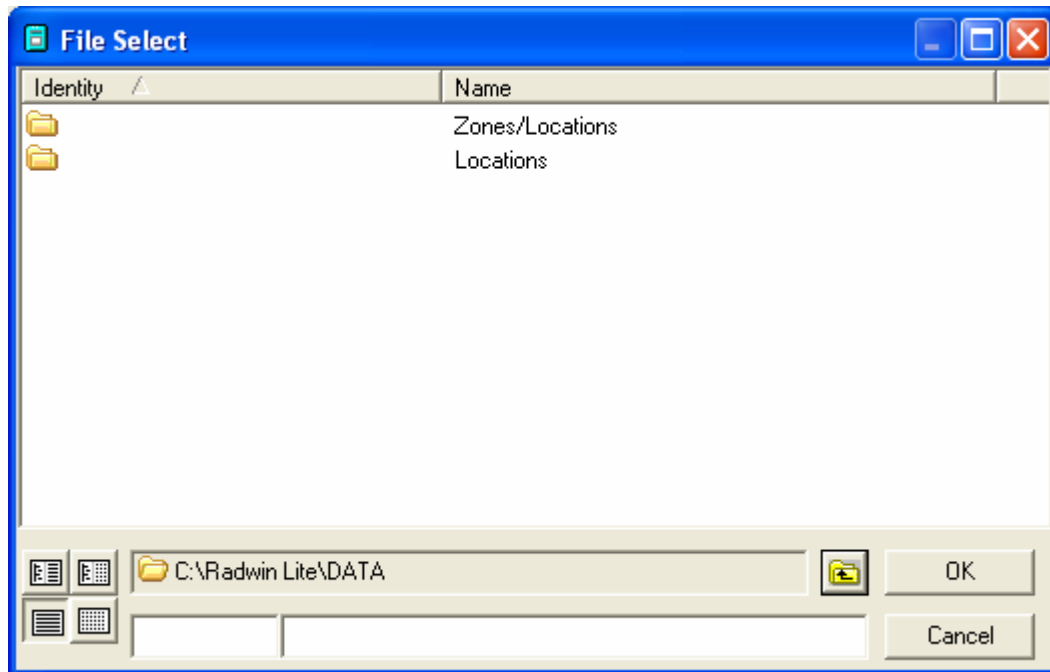
Assuming the parameters have been downloaded correctly; The Zone is the first part of the logger identity, and is used for grouping loggers within the software. The Location is the second part of the logger identity, and identifies a logger within a Zone.

In the **Zone Identity**, **Location Identity** and **Name** fields (see Figure 10), edit the logger identities and names if necessary, or click the **Select** button to select them from an existing database (see Figure 11).



The screenshot shows the 'Configure Logger Wizard' window. The title bar is blue with a close button. The window is divided into two main sections: 'Configuration Summary' on the left and 'Configuration Option' on the right. The 'Configuration Summary' section lists the following parameters: Logger Type: Lo-Log Flash, Connection Type: Direct (RS232), Baud Rate: 9600, and Logger Identity: \_\_02\_01. The 'Configuration Option' section is titled 'Logger Identity' and contains a text box with the instruction: 'The Logger identity is a unique identity that identifies the logger in the software. Enter the required identity or select one from the database with the Select button.' Below this, there are two input fields: 'Identity' (containing '\_\_02\_01') and 'Name' (empty). A 'Select...' button is next to the 'Identity' field. At the bottom of the window, there are three buttons: '<< Previous', 'Next >>', and 'Cancel'.

Figure 10 – Logger Zone and Location Identity Screen

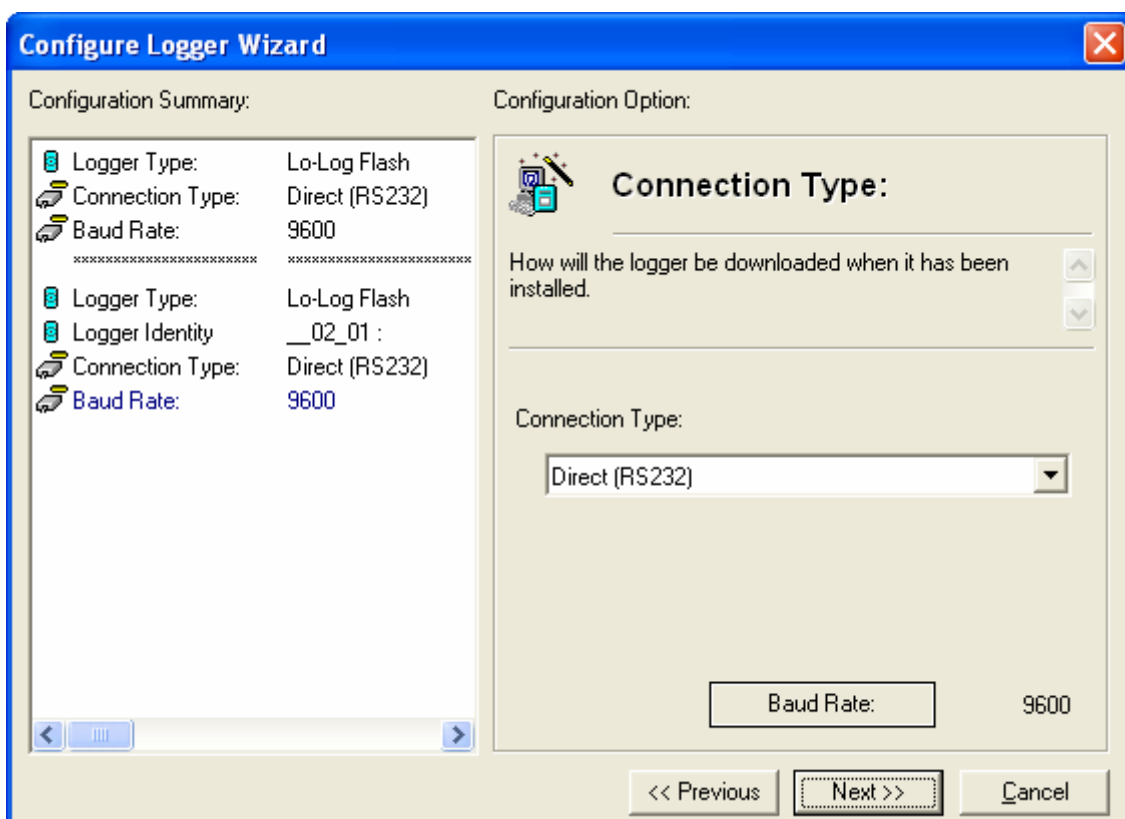


**Figure 11 – Zone and Location File Select Screen**

## Connection Type

How will the logger be downloaded when it has been installed?

At the **Connection Type** field (see Figure 12), select *Direct RS232* from the **Connection Type** drop-down menu.



**Figure 12 – Installed Logger Connection Type Screen**

## Baud Rate

What baud rate should be used to talk to the logger?

At the **Baud Rate** field (see Figure 12), select the appropriate baud rate from the drop-down menu options. The default rate of 9600 is correct for the Lo Log Logger.

## Autocall

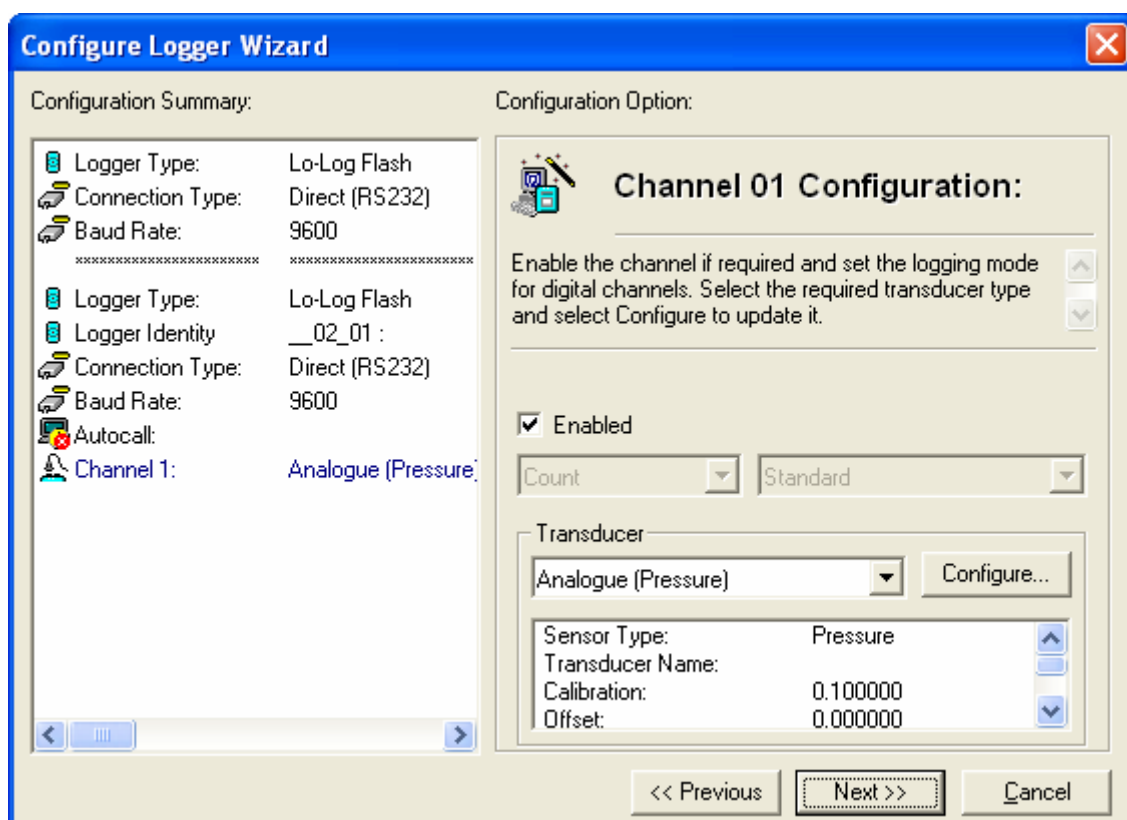
The **Autocall** screen that appears after the Connection Type screen is only relevant for Telemetry Loggers and not for the Lo Log Data Logger. Click the **Next** button.

## Channel 01 Configuration

Enable the channel if available and set the logging mode for digital channels.

### Note

The Radwin Lite software will detect the quantity and type of input channels of the Data Logger. The wizard will automatically enable the appropriate channel(s).



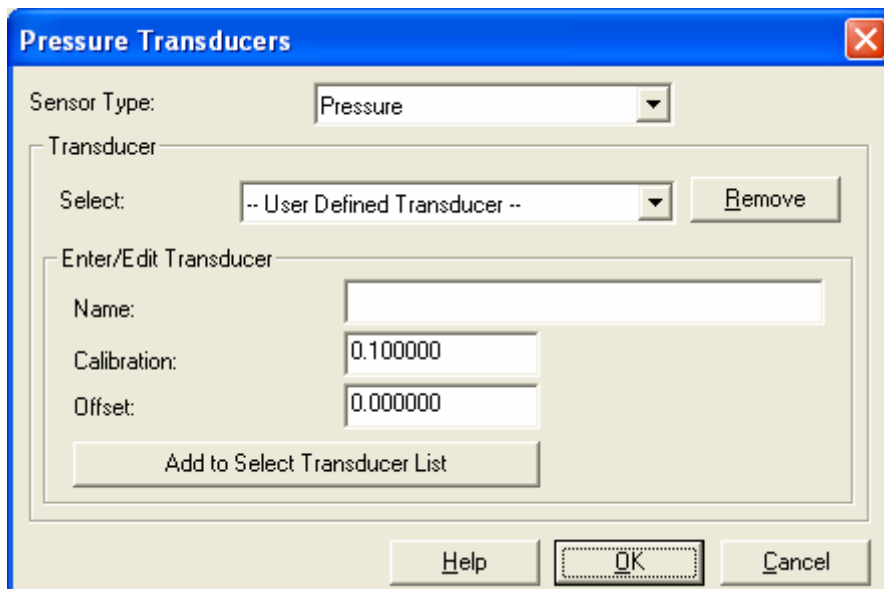
**Figure 13 – Channel 01 Configuration Screen**

Click in the **Enable** field to activate the channel (see Figure 13).

In the **Transducer** field, select the Transducer Type from the drop-down menu.

Click the **Configure** button to update the channel information.

Select the Sensor type to be connected to Channel 01 from the drop-down menu in the **Sensor Type** field, (see Figure 14).



The image shows a software window titled "Pressure Transducers" with a standard Windows-style title bar (blue with a close button). The window contains the following elements:

- Sensor Type:** A dropdown menu currently set to "Pressure".
- Transducer:** A section containing:
  - Select:** A dropdown menu currently showing "-- User Defined Transducer --". To its right is a "Remove" button.
  - Enter/Edit Transducer:** A sub-section with three input fields:
    - Name:** An empty text box.
    - Calibration:** A text box containing the value "0.100000".
    - Offset:** A text box containing the value "0.000000".
  - Add to Select Transducer List:** A button located below the input fields.
- Buttons:** At the bottom of the window are three buttons: "Help", "OK", and "Cancel".

**Figure 14 – Transducer Configuration Screen**

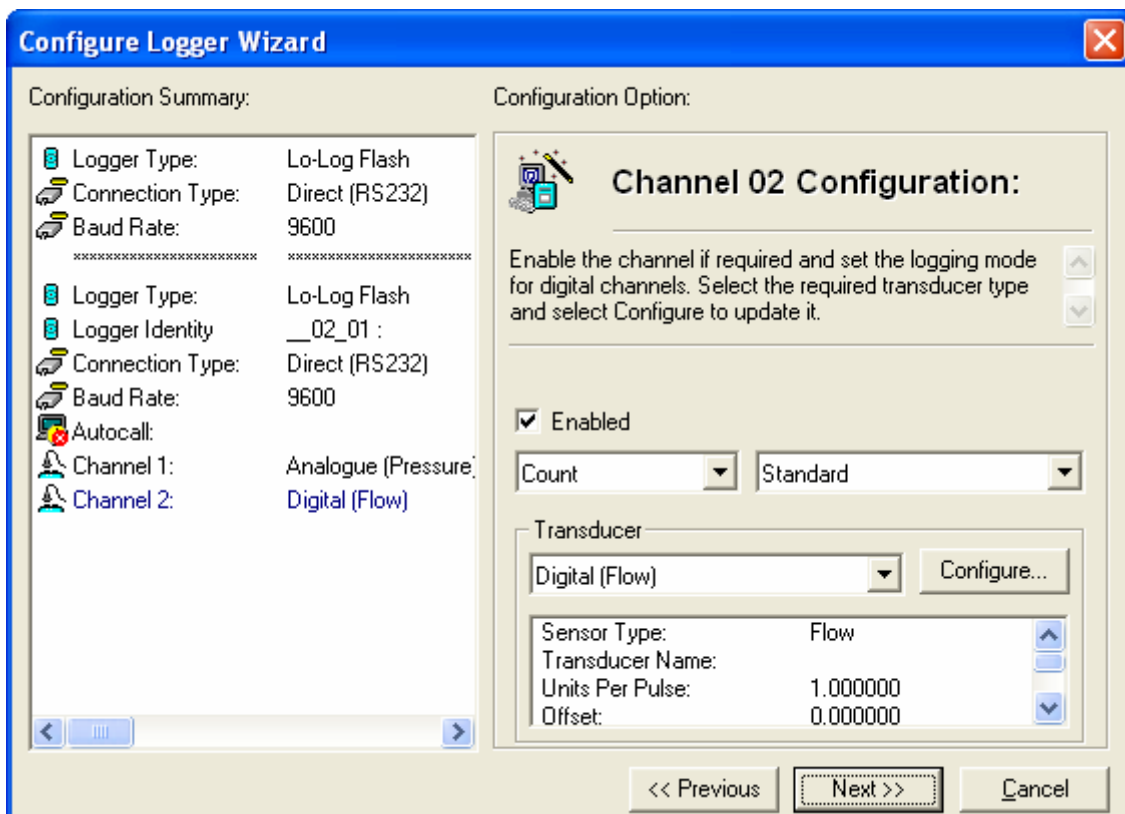
Select the required Transducer from the drop-down menu in the **Select Transducer** field.

If the transducer does not appear in the Transducer list, create a new transducer by entering **Name** of the new transducer, **Calibration** and **Offset** values into the **Enter/Edit Information** fields. Click on the **Add to the Select Transducer List** button to add the new transducer information to the transducer list.

Click the **OK** button.

## Channel 02 Configuration

Enable the channel if available and set the logging mode for digital channels.



**Configure Logger Wizard**

Configuration Summary:

- Logger Type: Lo-Log Flash
- Connection Type: Direct (RS232)
- Baud Rate: 9600
- \*\*\*\*\*
- Logger Type: Lo-Log Flash
- Logger Identity: \_\_02\_01 :
- Connection Type: Direct (RS232)
- Baud Rate: 9600
- Autocall:
- Channel 1: Analogue (Pressure)
- Channel 2: Digital (Flow)

Configuration Option:

**Channel 02 Configuration:**

Enable the channel if required and set the logging mode for digital channels. Select the required transducer type and select Configure to update it.

☒ Enabled

Count Standard

Transducer

Digital (Flow) Configure...

Sensor Type: Flow

Transducer Name:

Units Per Pulse: 1.000000

Offset: 0.000000

<< Previous Next >> Cancel

**Figure 15 – Channel 02 Configuration Screen**

Click in the **Enable** field to activate the channel (see Figure 15).

From the **Count** field drop-down menu, select the required option (*Count* or *Event*).

From the **Standard** field drop-down menu, select the required option (*Standard* or *Every x nd/th pulse*).

Select the Transducer Type from the **Transducer** field drop-down menu (*Digital (Flow)*).

Click on the **Configure** button to update the channel information.

Select the Sensor type to be connected to Channel 02 from the drop-down menu in the **Sensor Type** field.

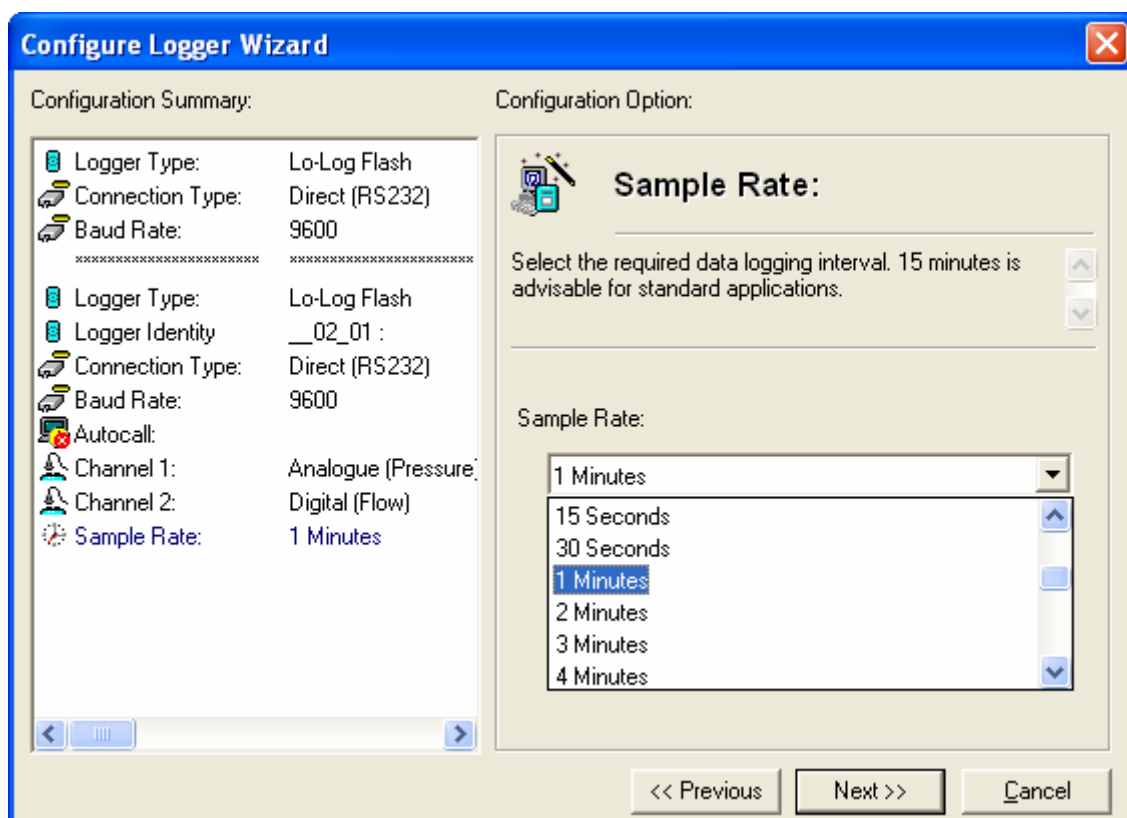
Select the required Transducer type from the drop-down menu in the **Select Transducer** list.

If the transducer does not appear in the Transducer list, create a new transducer by entering **Name** of the new transducer, **Calibration** and **Offset** values into the **Enter/Edit Information** fields. Click on the **Add to the Select Transducer List** button to add the new transducer information to the transducer list.

Click the **OK** button.

### Sample Rate

Select the required data-logging/sampling interval. The sample rate can be set from 1 second though to 24 hours. 15 minutes is recommended for standard applications.

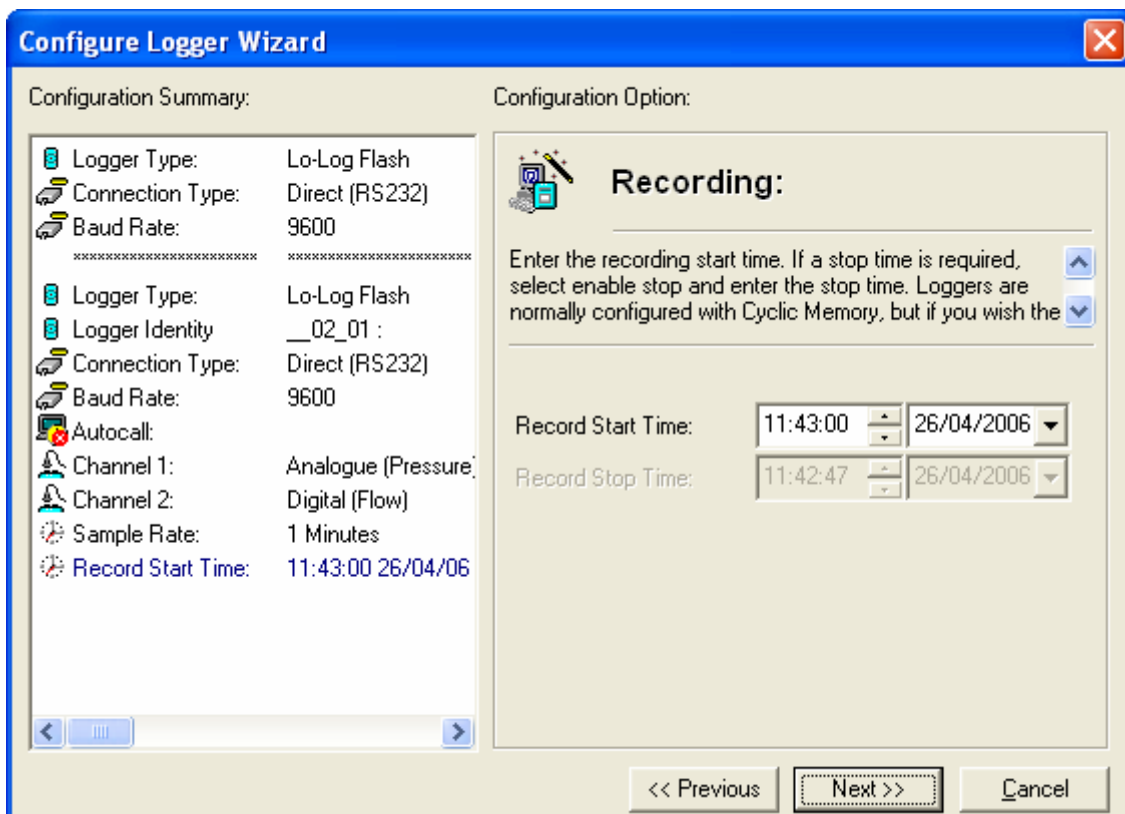


**Figure 16 – Logger Sample Rate Screen**

Select the required Sample Rate from the **Sample Rate** drop-down menu.

## Recording

Enter the recording start time.



The screenshot shows the 'Configure Logger Wizard' window, specifically the 'Recording' step. The window is divided into two main sections: 'Configuration Summary' on the left and 'Configuration Option' on the right.

**Configuration Summary:**

- Logger Type: Lo-Log Flash
- Connection Type: Direct (RS232)
- Baud Rate: 9600
- \*\*\*\*\*
- Logger Type: Lo-Log Flash
- Logger Identity: \_\_02\_01 :
- Connection Type: Direct (RS232)
- Baud Rate: 9600
- Autocall: (disabled)
- Channel 1: Analogue (Pressure)
- Channel 2: Digital (Flow)
- Sample Rate: 1 Minutes
- Record Start Time: 11:43:00 26/04/06

**Configuration Option: Recording:**

Enter the recording start time. If a stop time is required, select enable stop and enter the stop time. Loggers are normally configured with Cyclic Memory, but if you wish the

Record Start Time: 11:43:00 26/04/2006

Record Stop Time: 11:42:47 26/04/2006

Navigation buttons at the bottom: << Previous, Next >>, Cancel.

**Figure 17 – Logger Recording Time Screen**

Enter the time (24 hour clock) and the date for the logger to start recording. Manually input the date into the field or use the calendar when selecting the drop down menu.



## Upload Logger

The logger will now be uploaded with the entered parameters and will start logging at the set time and date. The information will be entered into the database under the Zone/Location identity.

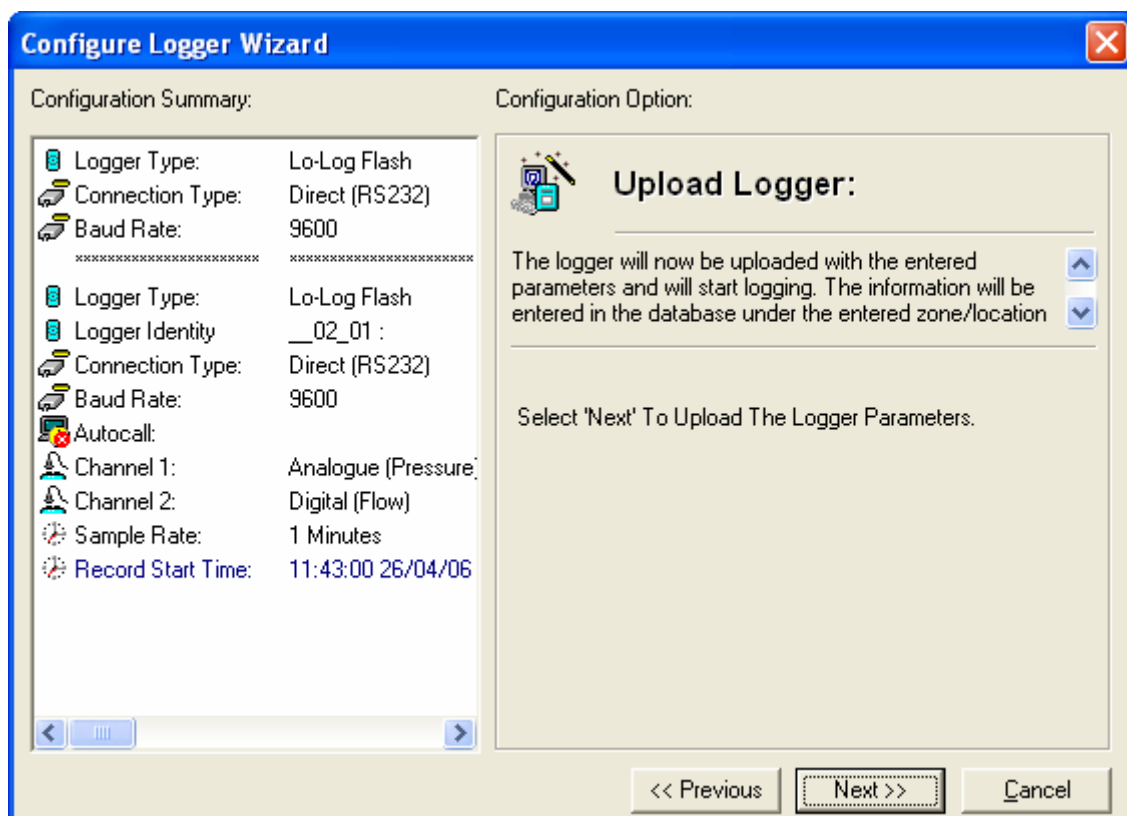
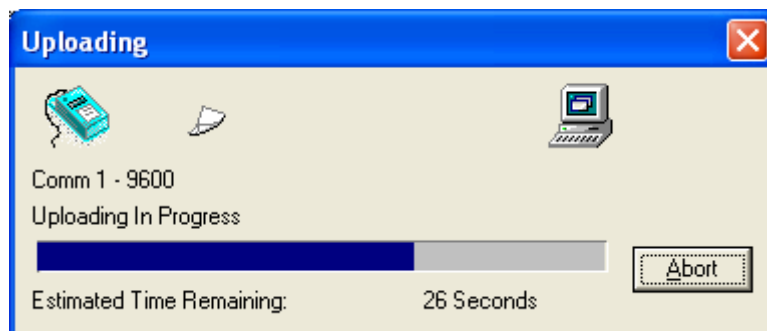


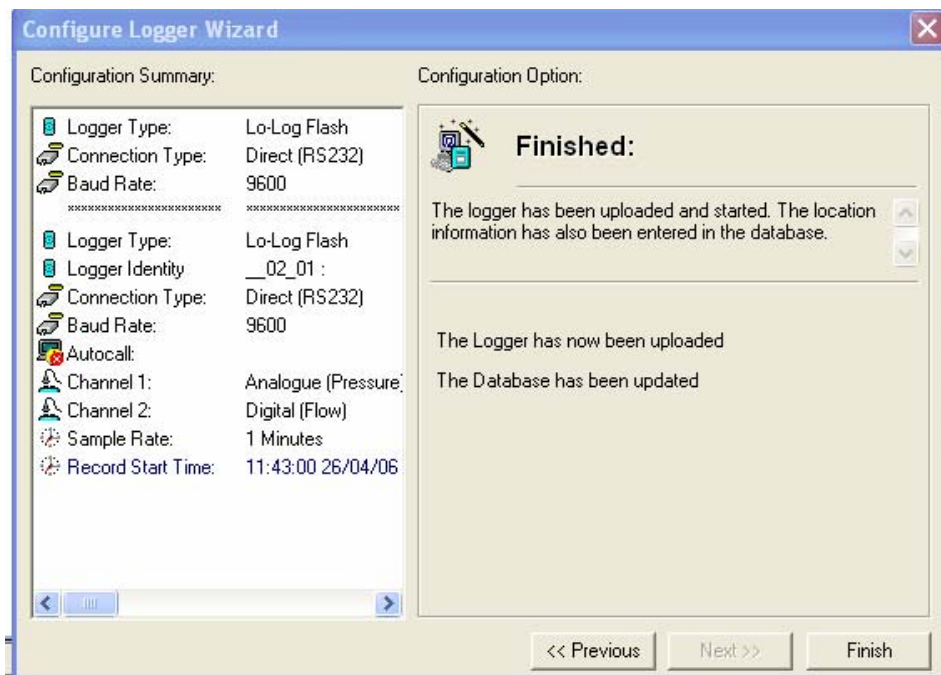
Figure 18 – Upload Logger Screen

Click on the **Next** button to upload the parameters to the logger.



The above screen will now appear to show the Logger Parameters are being *uploaded*.

The Finish Screen (Figure 19) will appear if the Logger Parameters have successfully uploaded to the logger.



**Figure 19 – Configure Logger Wizard Finished Screen**

Click the **Finish** button to exit the Configure Logger Wizard and return to the title screen.

Select **Exit** from the **File** drop-down menu to leave the Radwin Lite program.

## 11 Downloading Data from the Lo Log Data Logger

The information that has been recorded by and stored in the data logger can be downloaded directly to a PC or Portable Device and viewed by using the Radwin Lite **Download Data Wizard**.

Select the **Download Data Wizard** from the **Download Options** drop-down menu or the wizard icon  on the title page. Proceed after each option by clicking on the **Next** button.

### Note

- 1) An easy-to-use Help Menu is opened by default and contains all the necessary information to operate the software.
- 2) All of the configuration information can be seen on the left side of the screen of the **Configuration Summary** box of the Configure Logger Wizard screen (See Figure 7).

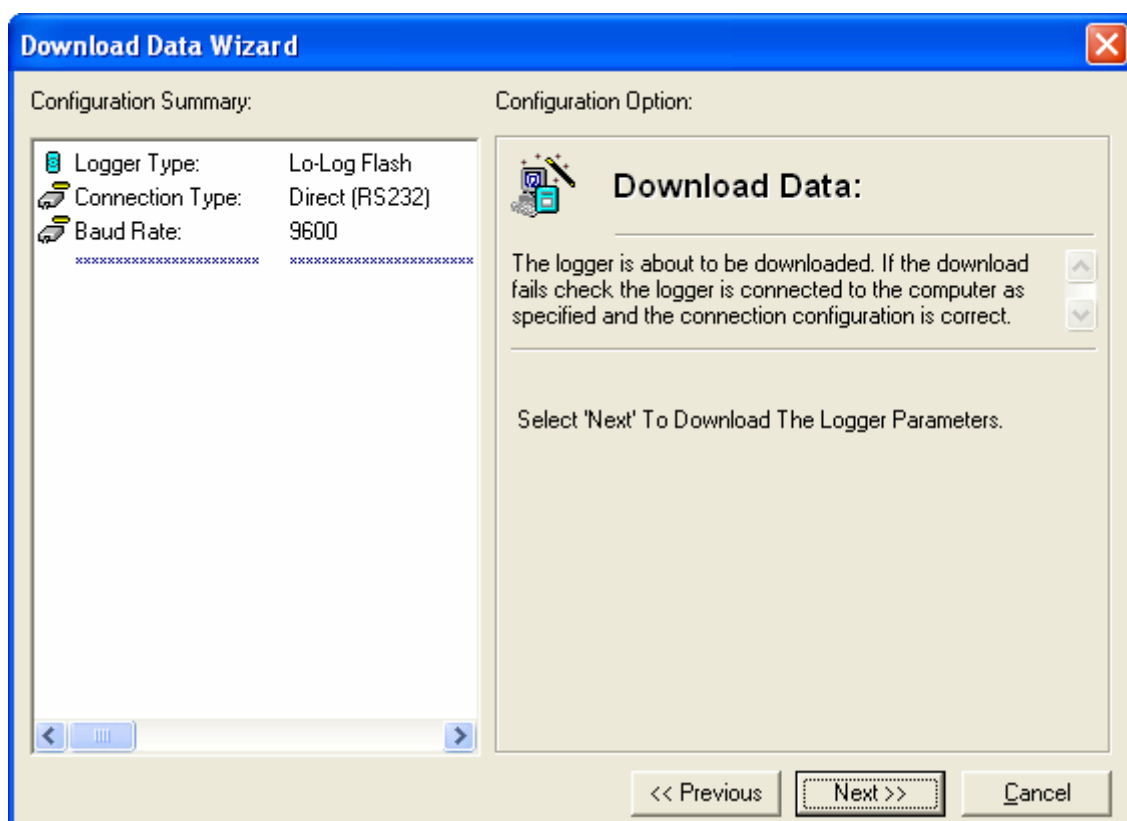
Select the type of logger (*Lo Log Flash*) being used, the location of the logger, the type of connection to the logger (*Direct RS232*) and the Baud Rate (*9600*) following the procedures used to configure the logger (see Page 14).

After making the above selections, the **Download Data** screen will appear (see Figure 20).

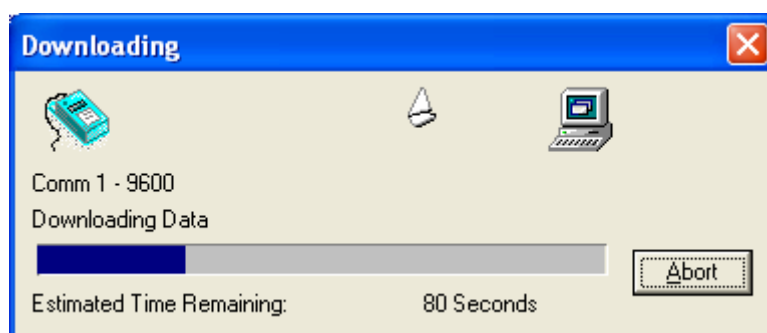
### Download Data

The logger is about to be downloaded. If the download fails, check the logger is connected to the computer as specified and the connection configuration is correct.

Click the **Next** button for the software to download the logger parameters.



**Figure 20 – Download Data Screen**



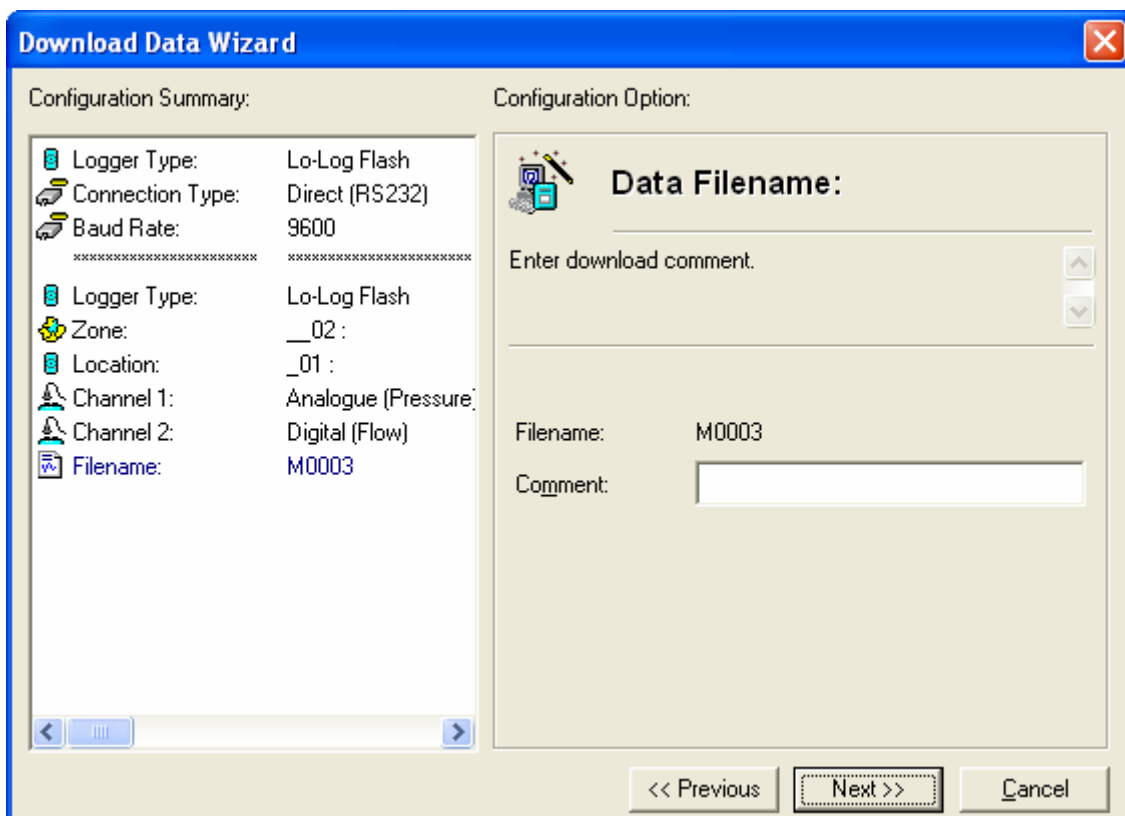
The above screen will now appear to show the Logger Parameters are being *downloaded*.

The wizard then allows the operator the opportunity to change the transducer configuration for the data downloaded from each channel of the logger. Follow the procedures used to configure the logger (see Page17) if changes are required.

Proceed through the logger configuration screens until you arrive at the **Data Filename** screen.

## Data Filename

The Data Filename screen (Figure 21) assigns a filename for the data to be stored, but allows the operator to insert a text comment into the **Comment** field (i.e. date of transfer, logger identity) that will be stored as part of the file.



The screenshot shows the 'Download Data Wizard' window with the 'Data Filename' tab selected. The window is divided into two main sections: 'Configuration Summary' on the left and 'Configuration Option' on the right.

**Configuration Summary:**

Logger Type:	Lo-Log Flash
Connection Type:	Direct (RS232)
Baud Rate:	9600
*****	
Logger Type:	Lo-Log Flash
Zone:	_02 :
Location:	_01 :
Channel 1:	Analogue (Pressure)
Channel 2:	Digital (Flow)
Filename:	M0003

**Configuration Option:**

**Data Filename:**

Enter download comment.

Filename: M0003

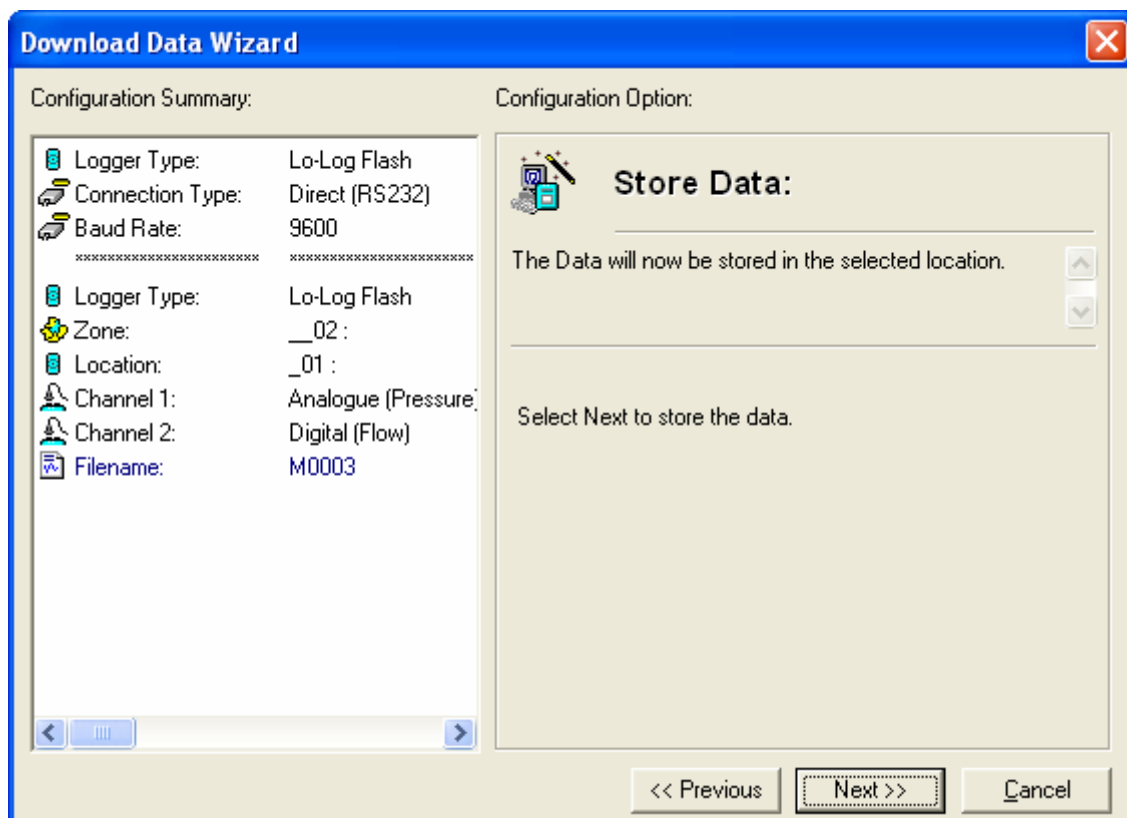
Comment:

Navigation buttons at the bottom: << Previous, Next >>, Cancel.

Figure 21 – Data Filename Screen

## Store Data

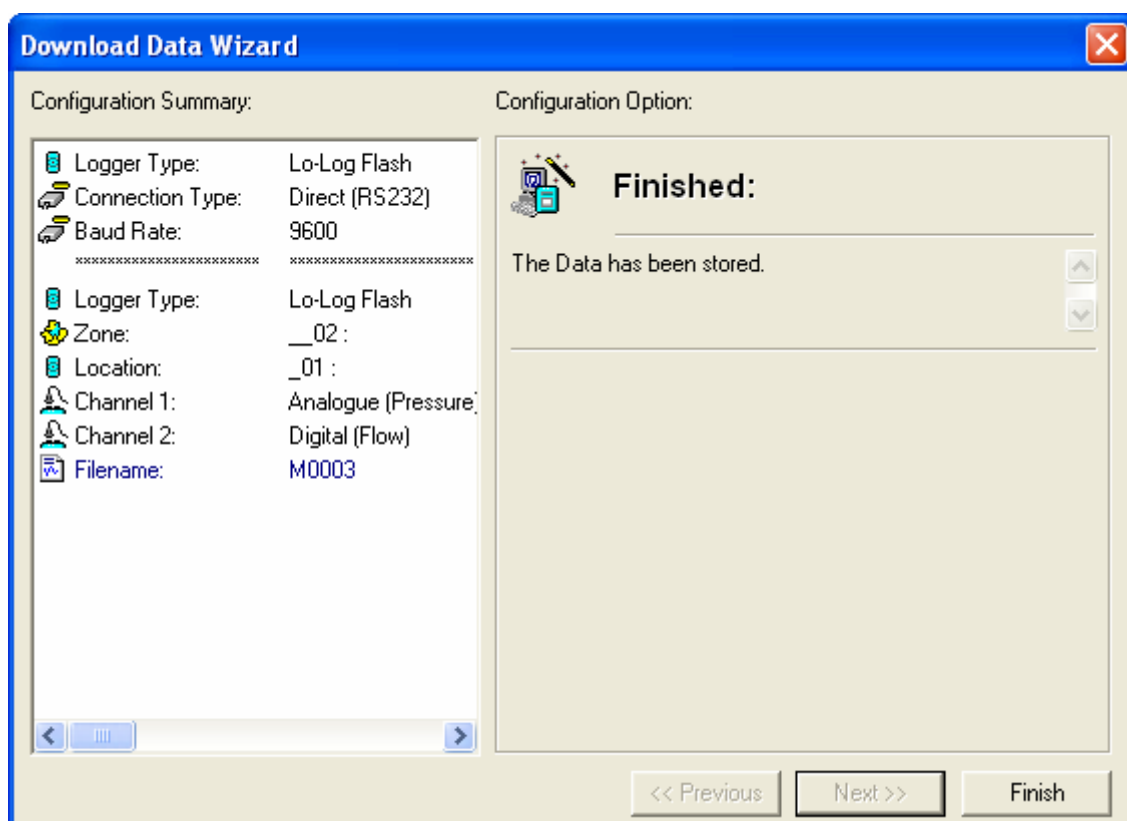
The recorded data will now be stored into the selected location shown in the Configuration Summary panel (see Figure 22).



**Figure 22 – Store Data Screen**

Click **Next** to store the data.

The Finish Screen (Figure 23) will now appear.



**Figure 23 – Download Data Wizard Finished Screen**

Click the **Finish** button to exit the Configure Logger Wizard.

After the Finish button has been clicked and the data downloaded, the recorded data will be displayed as a graph and data table (see Figure 24).

## 12 Graph and Data Table Manipulation

The graph and data table can be manipulated to display information for either channel. The type of graph and the format of the displayed data can be altered either by using the drop-down menu, the toolbars or by right clicking on the mouse.

### Note

An easy-to-use Help Menu is opened by default and contains all the necessary information to operate the software.

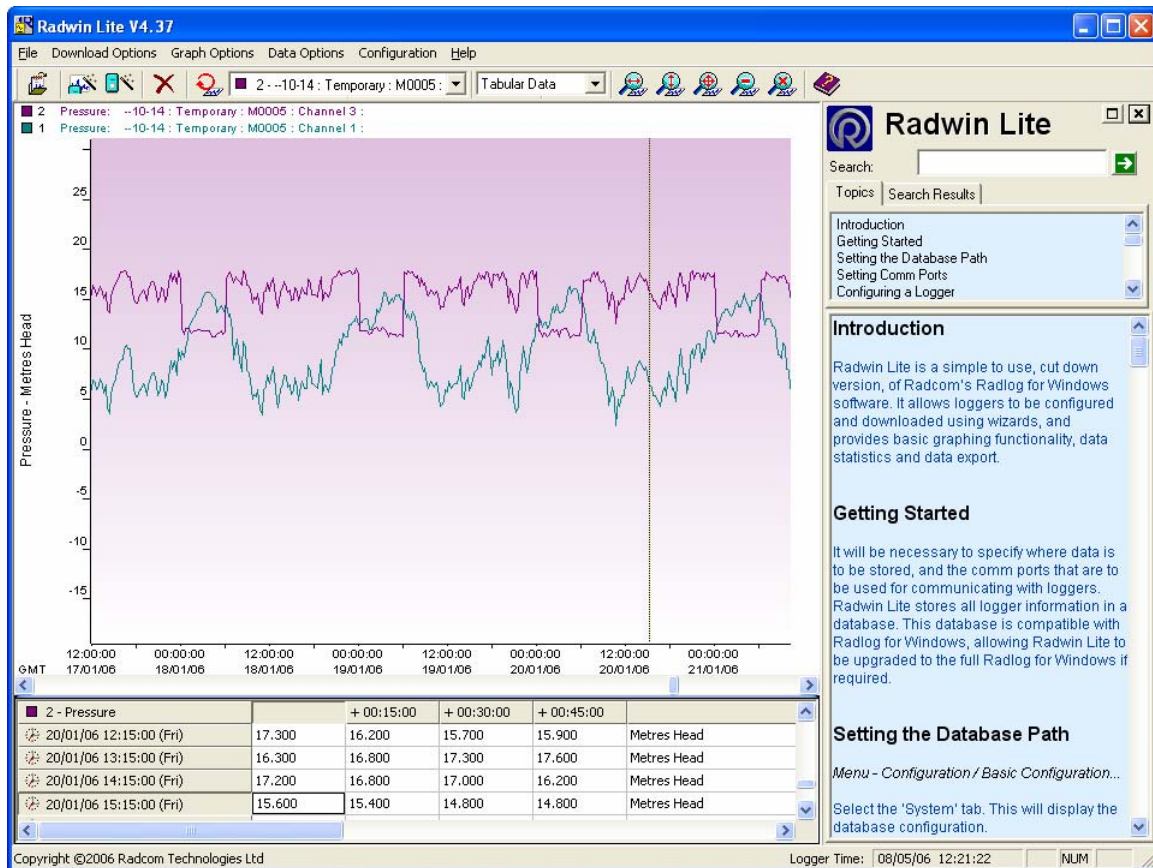



Figure 24 – Radwin Lite Data Graph Screen



## 12.1 Selecting the Input Channel Data to be viewed

The graph and table will display the data stored for each channel. If the logger has a single input, the data for that channel will be displayed. If the logger has two inputs the information for the either channel can be selected by either:

- Using the drop-down menu on the toolbar,
- clicking on the Cycle Through Graphs icon , or
- right clicking on the mouse and selecting the required channel from the **Graph Select** option (see Figure 25).

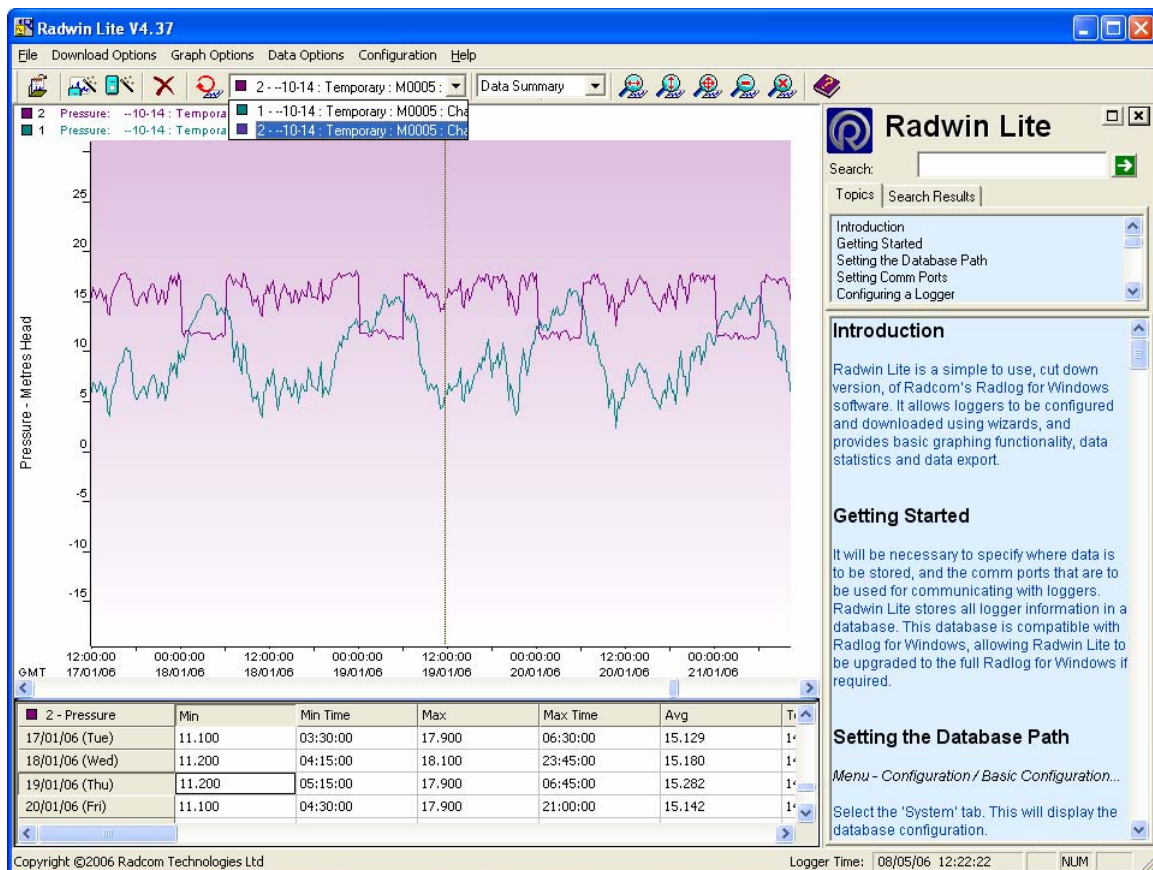


Figure 25 – Channel Selection Toolbar

## 12.2 Changing the Information in the Data Table

The information that is displayed in the data table below the graph can be changed to show Cursor Values, Tabular Data, Data Summary or Graph Statistics. The cursor values option displays the value for each graph, while the other options display the values for the selected channel. The information in the table can be opened in .CSV or .TXT file format. The required information can be selected by either:

- Selecting the option from the **Data Options** tab on the main menu, or
- clicking on the toolbar to display the options for the Table Data (see Figure 26).

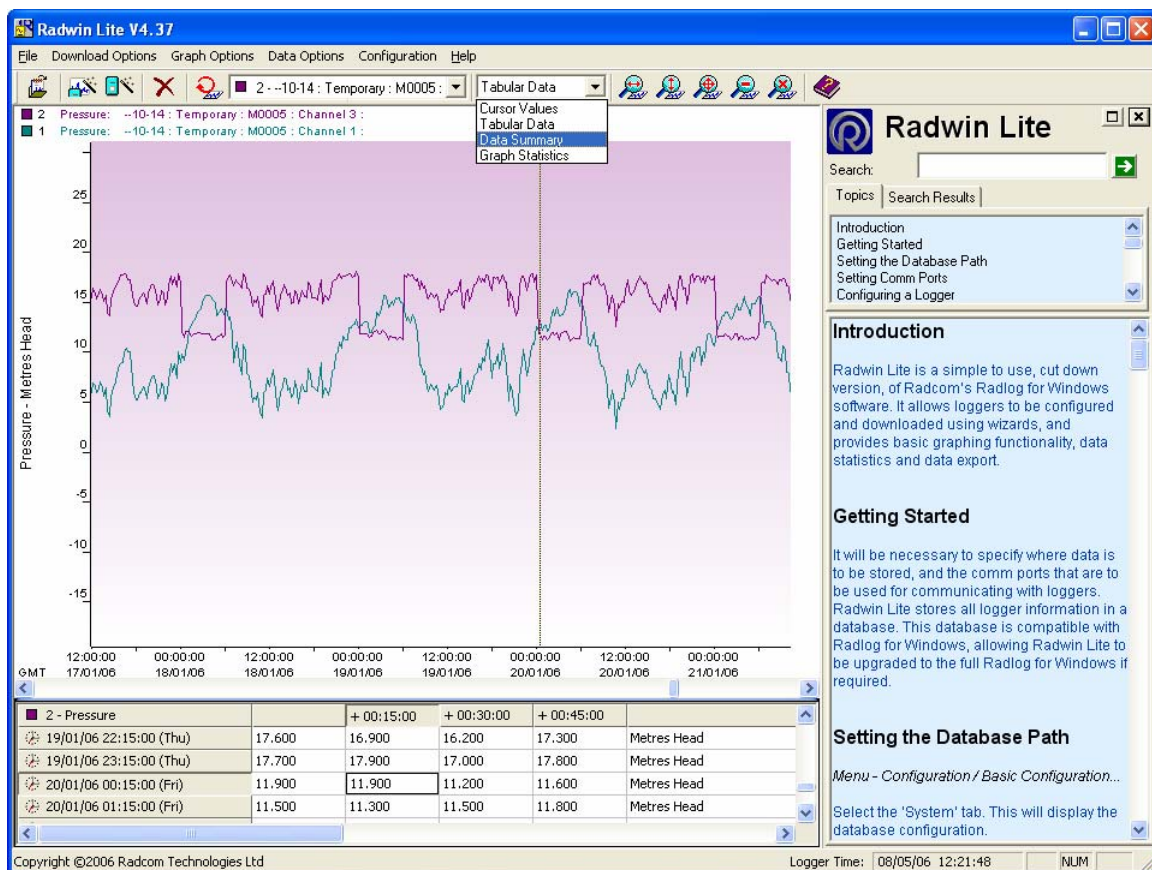


Figure 26 – Selecting the Table Data Format


The data format options are summarised in Table 3 below.

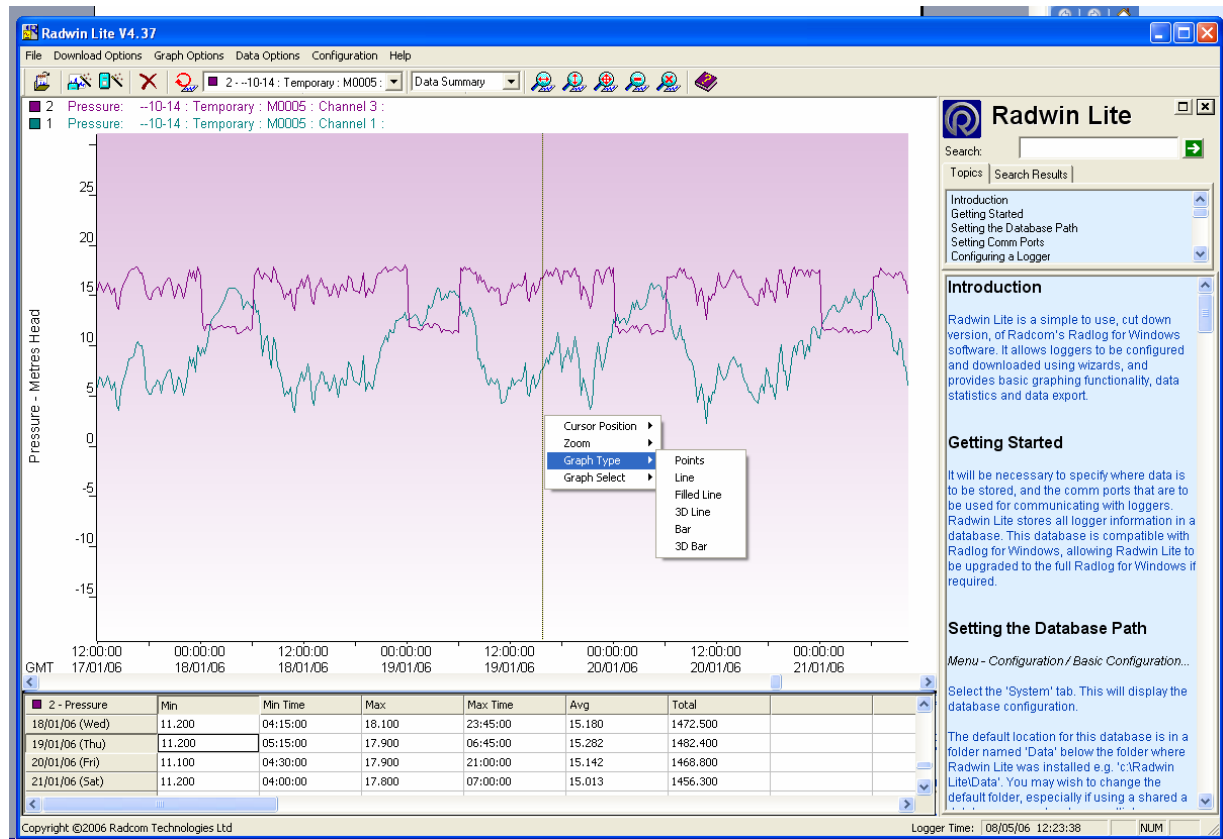
**Table 3 – Table Data Format Options**

<b>Cursor Values</b>	Displays graph data values for each graph in the tabular data table below the graph as the cursor is moved across the graph.
<b>Tabular Data</b>	Displays tabular data for the current graph in the tabular data table. The value at the cursors position is highlighted in the table as the cursor is moved across the graph.
<b>Data Summary</b>	Displays a daily summary for the current graph in the tabular data table. The day of the cursors position is highlighted in the table as the cursor is moved across the graph.
<b>Graph Statistics</b>	Displays Statistics for the current graph in the tabular data table. The statistics are for the currently visible time span of the graph.
<b>Open CSV File (MS Excel)</b>	Writes the contents of the tabular data table to a temporary CSV file that is automatically opened using the default CSV file viewer - normally MS Excel.
<b>Open TXT File</b>	Writes the contents of the tabular data table to a temporary TXT, file that is automatically opened using the default TXT file viewer.

### 12.3 Changing the Graph Style

The operator can change the style of the graph, view the graph from different axes, remove a graph from the display, or copy and export the graphs to be viewed by other programs. These options can be selected by either:

- Clicking on the **Graph Options** tab on the main menu,
- clicking on the **Zoom** toolbar icons , or
- right clicking on the mouse and selecting the required **Graph Type** or **Zoom** option (see Figure 27).



**Figure 27 – Selecting the Graph Format**

By right clicking on the mouse and selecting **Cursor Position** from the menu, the data value (*Day, Date, Time and recorded value*) will be displayed for the position of the cursor in the current graph.

A summary of the options is shown in Table 4 below.

**Table 4 – Graph Format Options**

**ZOOM OPTIONS**

<b>Zoom Time Region</b>	Puts the graph in Zoom X axis mode. Left click the graph once to specify the start point, and again to specify the end point.
<b>Zoom Y Axis Region</b>	Puts the graph in Zoom Y axis mode. Left click the graph once to specify the start point, and again to specify the end point.
<b>Zoom Y Axis Region and Time Region</b>	Puts the graph in Zoom XY axis mode. Left click the graph once to specify the start point, and again to specify the end point.
<b>Zoom Out</b>	Zooms out to the previous zoom level
<b>Zoom Full</b>	Displays the graph full size removing all zoom levels.

**GRAPH OPTIONS**

<b>Points</b>	Displays graphs as single data points.
<b>Line</b>	Displays graphs with data points as joined lines.
<b>Filled Line</b>	Same as Line but fills the area under the graph.
<b>3D Line</b>	Same as Line but with a 3D effect.
<b>Bar</b>	Each data point is displayed as a bar.
<b>3D Bar</b>	Same as Bar but with a 3D effect.
<b>Remove Graph</b>	Removes the current graph - indicated as the top most graph title above the graph
<b>Remove All Graphs</b>	Removes all displayed graphs.
<b>Export Data</b>	Allows an export format to be selected and exports the data to a file.
<b>Copy Graph To Clipboard</b>	Puts a copy of the graph on the clipboard so it may be pasted into other application as an image.

## 13 Lo Log Vista Display Options

The values shown on the LCD display panel on the Lo Log Vista Data Logger can be changed to suit the users requirements. The operator must have the **Download Upload 32** module of the "Radcom for Windows" software suite installed on the PC or PDA to be connected to the logger.

To change the display format, proceed as follows:

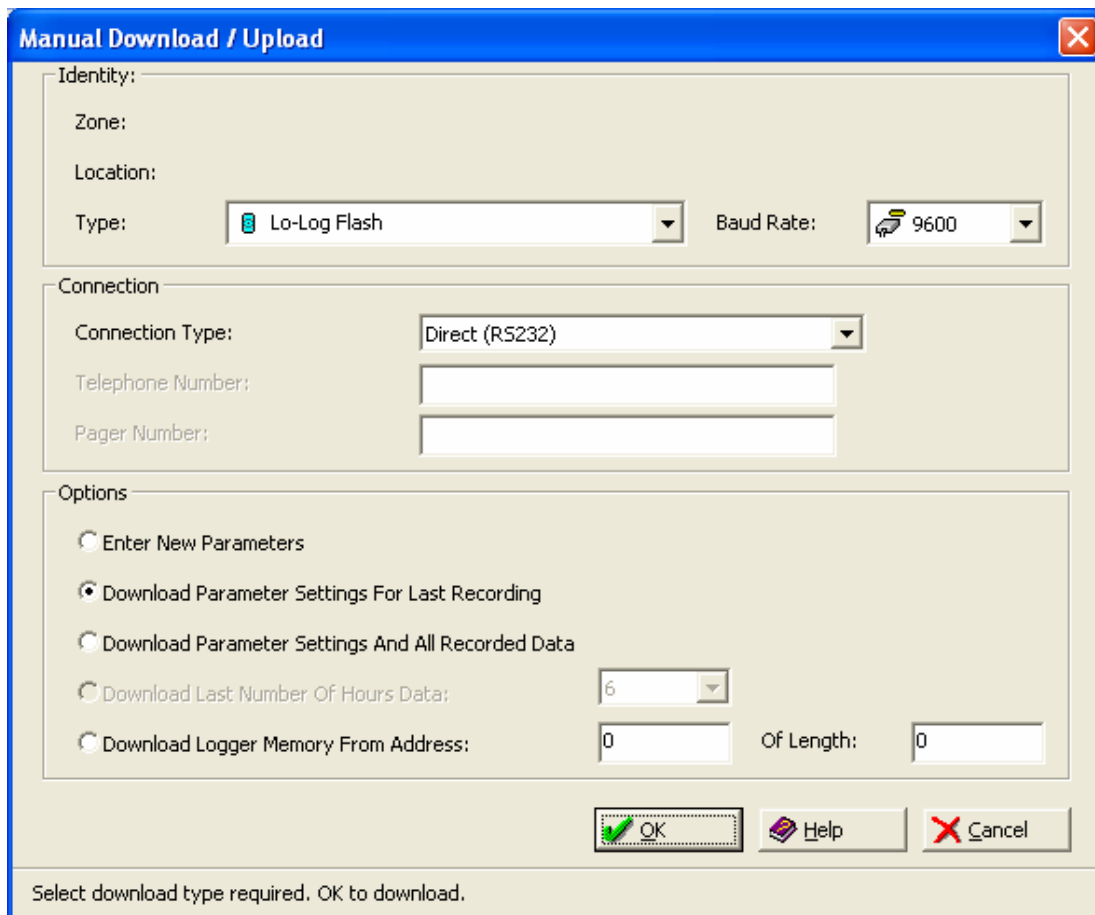
Select **Download Upload 32** from the start menu.

Select **Download/Upload** from the **Transfers** drop-down menu or click on the icon .

Select the **Logger Type** (*Lo Log Flash*), **Baud Rate** (*9600*) and **Connection Type** (*Direct RS232*) from the drop-down menus shown in Figure 28.

Select the **Download Parameter Settings for Last Recording** option by clicking in to the check box.

Click on the **OK** button.



**Manual Download / Upload**

Identity:

Zone:

Location:

Type: Lo-Log Flash Baud Rate: 9600

Connection

Connection Type: Direct (RS232)

Telephone Number:

Pager Number:

Options

☐ Enter New Parameters

☒ Download Parameter Settings For Last Recording

☐ Download Parameter Settings And All Recorded Data

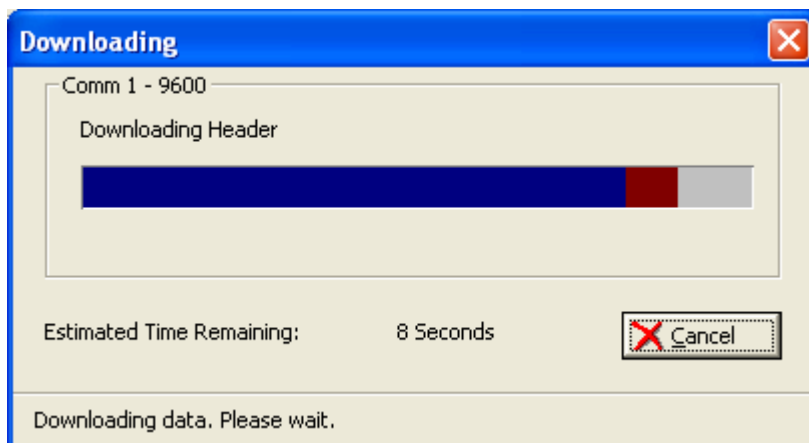
☐ Download Last Number Of Hours Data: 6

☐ Download Logger Memory From Address: 0 Of Length: 0

OK Help Cancel

Select download type required. OK to download.

**Figure 28 – Manual Download/Upload Screen**



**Downloading**

Comm 1 - 9600

Downloading Header

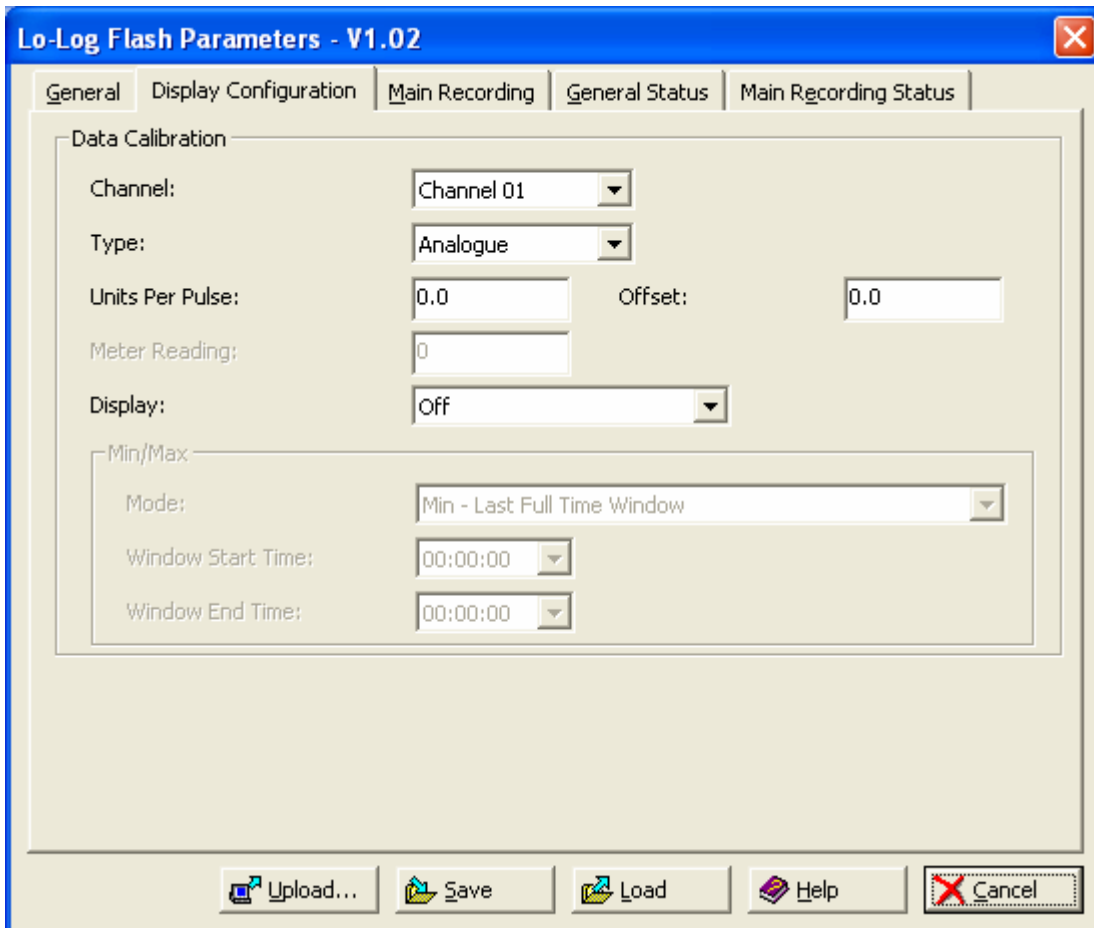
Estimated Time Remaining: 8 Seconds

Cancel

Downloading data. Please wait.

The above screen will appear to show that the logger parameter settings for the last recording are being *downloaded* to the PC/PDA.

When the parameter settings have been downloaded the **Lo-Log Flash Parameters** screen will appear. Select the **Display Configuration** tab on the Lo-Log Flash Parameter screen as shown below.

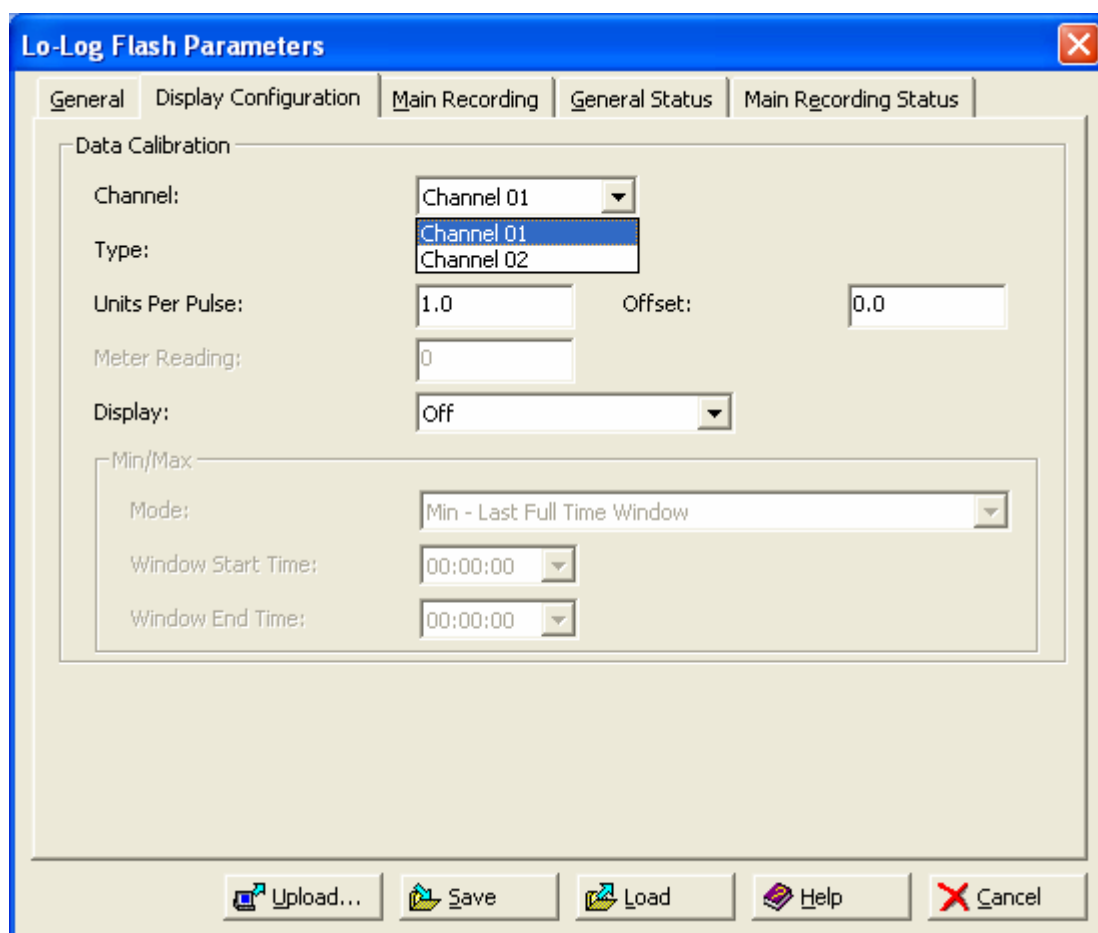


The screenshot shows the 'Lo-Log Flash Parameters - V1.02' window with the 'Display Configuration' tab selected. The window has a blue title bar and a standard Windows-style interface. The 'Data Calibration' section contains the following fields: 'Channel' (dropdown menu showing 'Channel 01'), 'Type' (dropdown menu showing 'Analogue'), 'Units Per Pulse' (text box with '0.0'), 'Offset' (text box with '0.0'), 'Meter Reading' (text box with '0'), and 'Display' (dropdown menu showing 'Off'). Below this is a 'Min/Max' section with 'Mode' (dropdown menu showing 'Min - Last Full Time Window'), 'Window Start Time' (time picker showing '00:00:00'), and 'Window End Time' (time picker showing '00:00:00'). At the bottom of the window are five buttons: 'Upload...', 'Save', 'Load', 'Help', and 'Cancel'.

**Figure 29 – Lo-Log Flash Parameter Screen**

Select the required channel from the **Channel** drop-down list.





**Figure 30 – Display Configuration Channel Select**

The display on the Lo Log Vista can be configured for Analogue and Digital Channels to display the following:

## 13.1 Analogue Channels

### Display Values

To configure the logger to display a meaningful value the **Units per Pulse** field and the **Offset** field must contain a meaning number as per the formula below;

Display value (D) = recorded data in memory (raw number (R)) x unit per pulse (N) – offset (O)

$$D = R \times N - O$$

A standard logger fitted with internal pressure sensor is calibrated over a 10 bar range and stores data in memory in units of decimetres.

To display values in different measurement units on the LCD for a standard pressure channel select the Units per Pulse value from Table 5 below, the Offset value will always be 0.

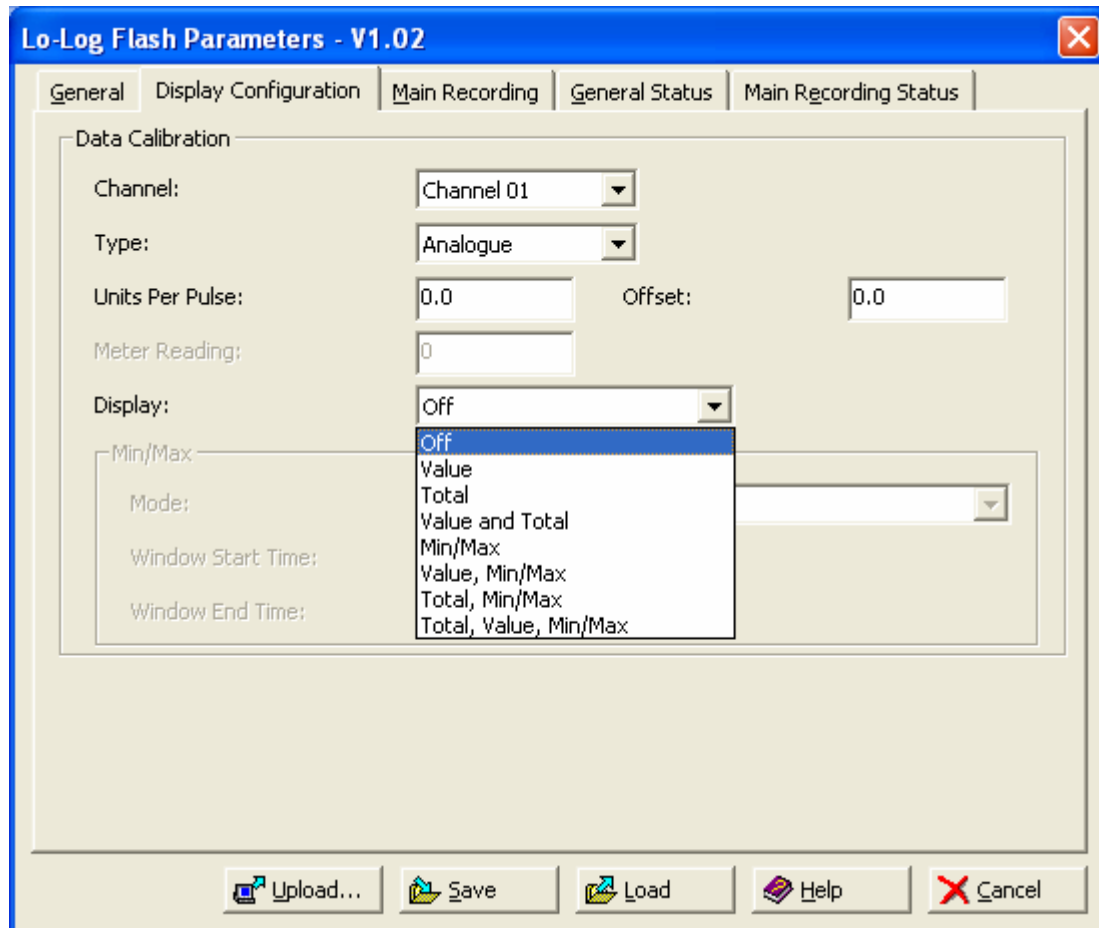
**Table 5 – Units per Pulse Values**

LCD DISPLAY VALUE	UNIT PER PULSE	OFFSET
Decimetres	1	0
Meters	0.1	0
Bar	0.01	0
PSI	0.06	0

#### Note

The display will continuously loop round the selected information from the chosen options shown in Table 6.

The user can select different values to be displayed on the Logger LCD screen by selecting the required option from the **Display** drop-down list (see Figure 31). A summary of the display options is shown in Table 6 below.



**Figure 31 – Display Configuration Display Values**

**Table 6 – Lo Log LL Vista Display Options**

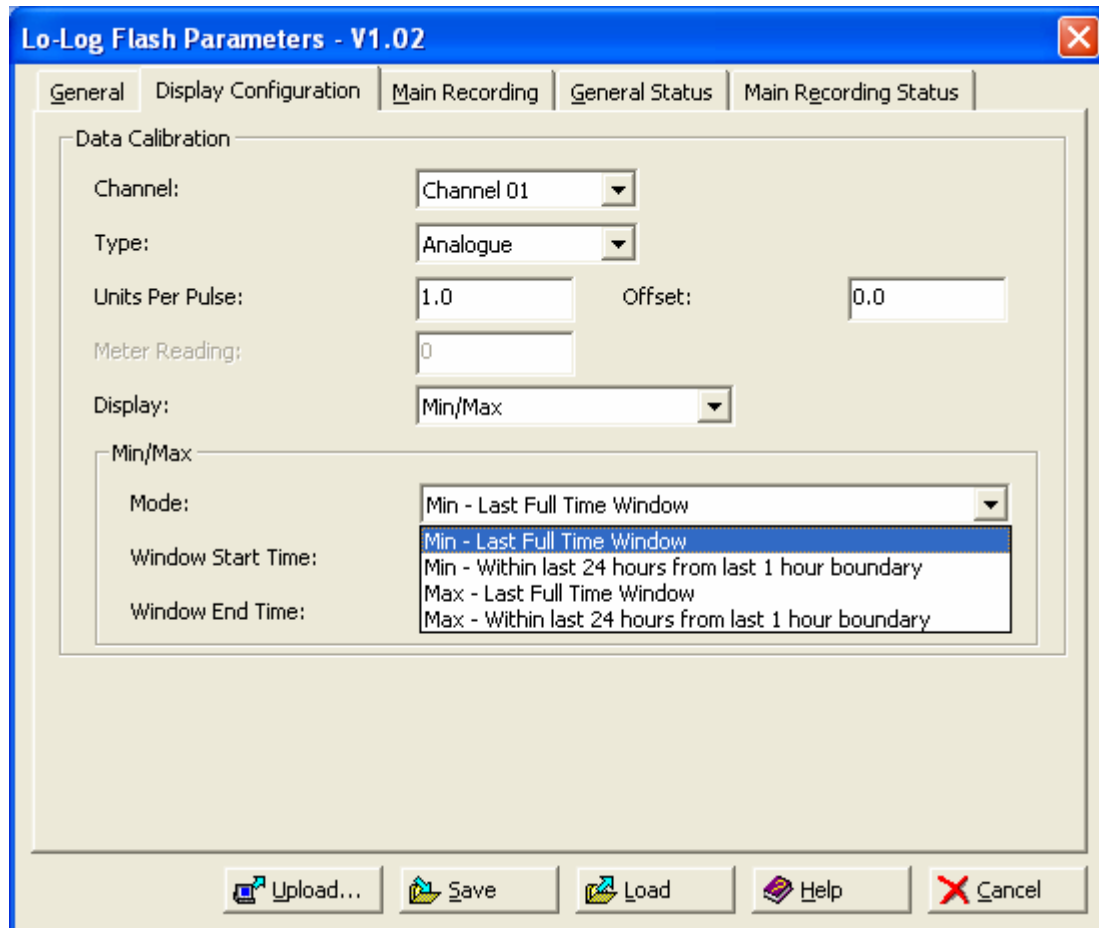
	<b>OPTION</b>	<b>DISPLAY</b>
1	OFF	Displays time of day only
2	VALUE	Displays time of day, channel number and the latest value of the selected channel
3	TOTAL	Displays time of day, channel number and the total flow volume for the selected channel
4	VALUE & TOTAL	Displays 1, 2 & 3
5	MIN/MAX	Displays the minimum or maximum value during the last 24 hours
6	VALUE, MIN/MAX	Displays 1, 2 & 5
7	TOTAL, MIN/MAX	Display 1,3 & 5
8	TOTAL, VALUE, MIN/MAX	Displays 1, 2, 3 & 5

**Note**

For analogue pressure channels the **TOTAL** option is meaningless.

**MIN/MAX Value**

The min/max value is calculated during either the **Last Full Time Window** (start and end hours set by user) or **Within the last 24 hours from last 1 hour boundary** (see Figure 32).



**Lo-Log Flash Parameters - V1.02**

General | Display Configuration | **Main Recording** | General Status | Main Recording Status

Data Calibration

Channel: Channel 01

Type: Analogue

Units Per Pulse: 1.0 Offset: 0.0

Meter Reading: 0

Display: Min/Max

Min/Max

Mode: Min - Last Full Time Window

Window Start Time: Min - Last Full Time Window

Window End Time: Min - Within last 24 hours from last 1 hour boundary

Max - Last Full Time Window

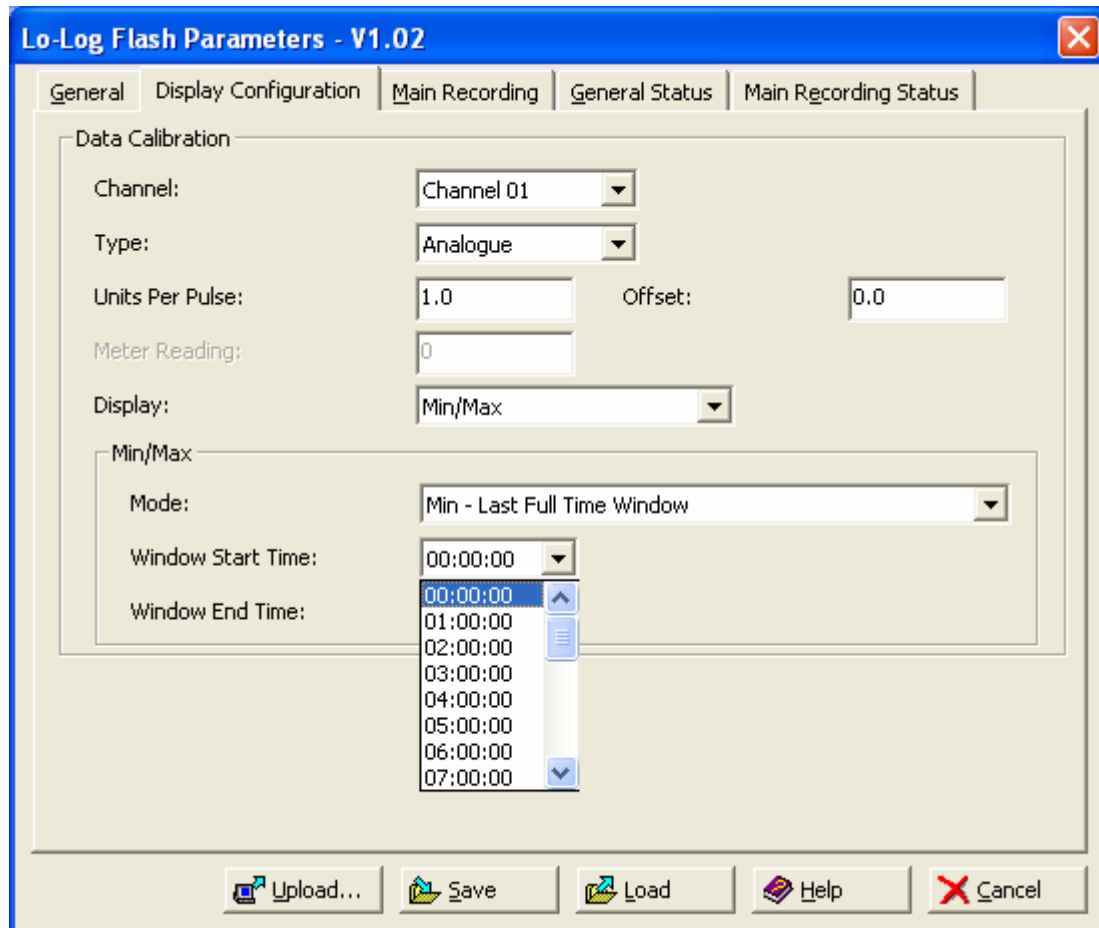
Max - Within last 24 hours from last 1 hour boundary

Upload... Save Load Help Cancel

**Figure 32 – Min/Max Options**

The **Last Full Time Window** min/max value is calculated during the Window Start Time and the Window End Time. To set the Last Full Time Window select the start and end hour value from the **Window Start Time** and **Window End Time** drop-down lists (see Figure 33 below).

The **Within last 24 hour from last 1 hour boundary** value is calculated during the latest 24 hours.



**Figure 33 – Last Full Time Window Settings**

## 13.2 Digital Channels

### Display Values

To configure the logger to display a meaningful value the **Litres per Pulse** field must contain a meaning number as per the formula below. The **Offset** value is always 0;

The user must find out the Litre per Pulse value for the meter and sensor being used.

$$\text{Display value (D)} = \frac{\text{total pulses during the logging interval (R) x unit per pulse (N) - offset (O)}{\text{Logging interval time (seconds) (T)}}$$

$$D = \frac{R \times N - O}{T}$$

The logger will display, by default, in Litres per Second. To display in any other measurement unit, the values from Table 7, assuming the flow meter/sensor generates 1 pulse for 1 litre of water, will need to be input into the **Litre per Pulse** field.

**Table 7 – Litres per Pulse Values**

LCD DISPLAY VALUE	LITRES PER PULSE	OFFSET
Litres/Second	1	0
Litres/Minute	60	0
Litres/Hour	3600	0
Meter <sup>3</sup> /Hour	3.6	0

#### Note

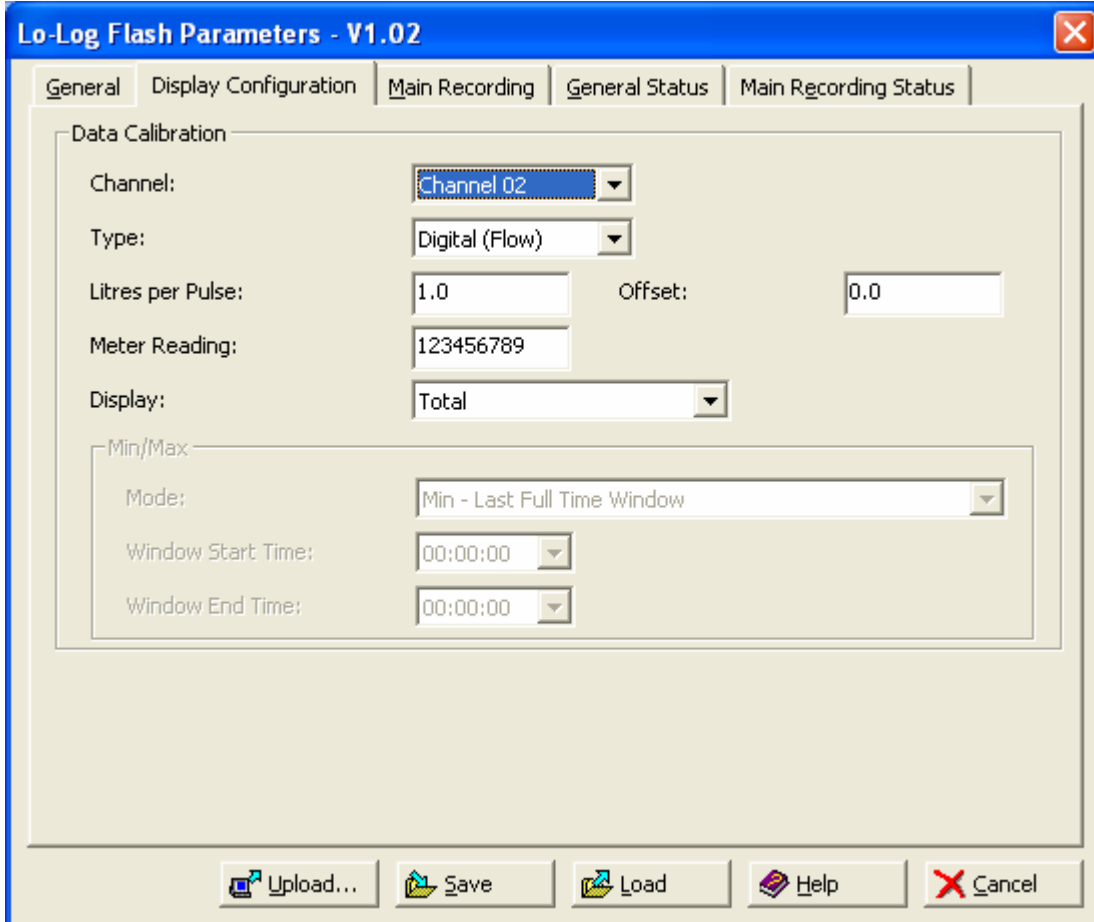
The display will continuously loop round the selected information from the chosen options shown in Table #.

The user can select different values to be displayed on the Logger LCD screen by selecting the required option from the **Display** drop-down list (see Figure 31). A summary of the display options is shown in Table 6 above.

## Meter Reading

The logger can be configured with a meter reading to a resolution of 10 units (Litres).

The example shown in Figure 34 shows a value 123456789 which equates to a LCD display value of 1234567890 litres.



**Lo-Log Flash Parameters - V1.02**

General | Display Configuration | **Main Recording** | General Status | Main Recording Status

Data Calibration

Channel: Channel 02

Type: Digital (Flow)

Litres per Pulse: 1.0 Offset: 0.0

Meter Reading: 123456789

Display: Total

Min/Max

Mode: Min - Last Full Time Window

Window Start Time: 00:00:00

Window End Time: 00:00:00

Upload... Save Load Help Cancel

**Figure 34 – Meter Reading Field**

## MIN/MAX Value

The min/max values are selected in the same manner as the Analogue channel.

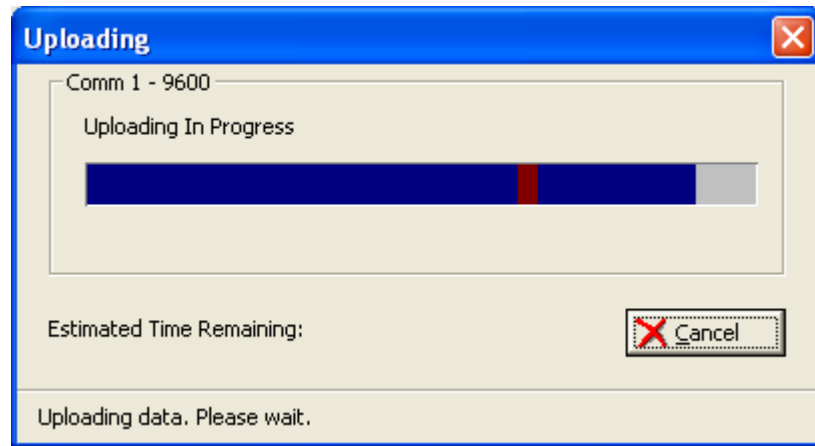
Once the data calibration settings have been completed, click on the **Upload** button to select the upload options from the **Upload Parameter** screen shown below.



**Figure 35 – Upload Parameters Screen**

Check the **General Parameters** box under the Options and click **OK**.

The following screen will appear to indicate the parameters are being uploaded.



When uploading is complete, the **Display Configuration Tab** on the **Lo Log Flash Parameters** screen (Figure 29) reappears. The user can check the options that have been selected or exit from the software by clicking on the **Cancel** button twice and selecting **File/Exit**.

## Annex A – Connection Details

### Cable Details

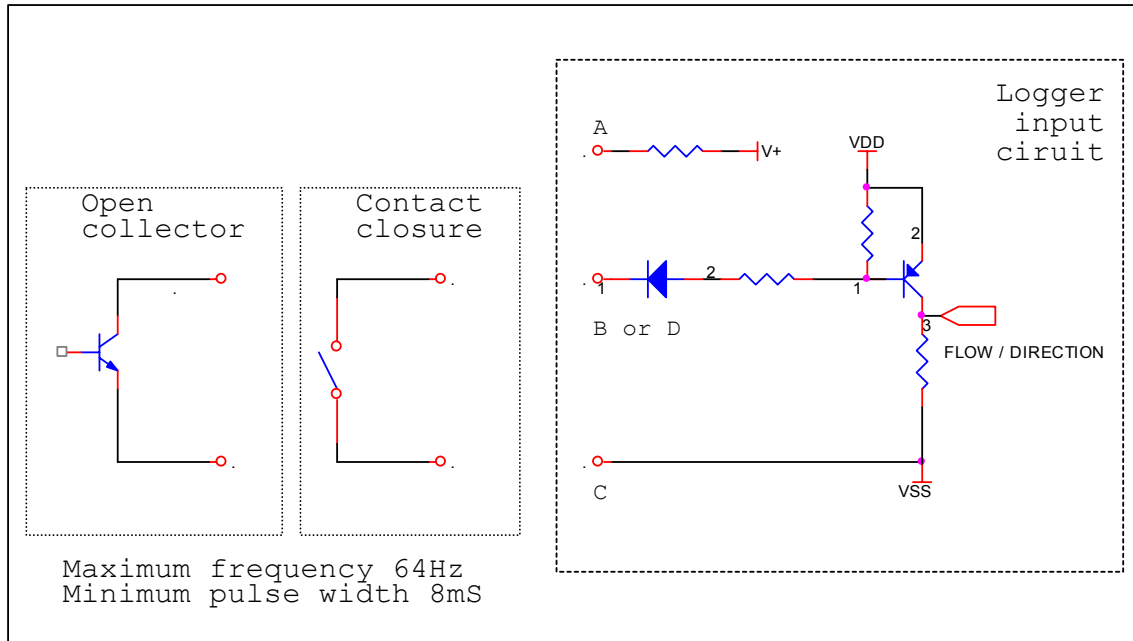
**Table A1 – Cable Details for Lo Log Data Logger**

Logger Type	Part Number	Cable Description
Lo Log	RAG R10	Infra-Red download lead to 9 pin D plug

### Flow Input

**Table A2 – 4 Pin Connector Type 62GB57A-10-4**

Pin No.	Title	Description
A		Not connected
B	Flow	Flow input signal (pulses)
C	GND (0V)	Ground (0 volts)
D	Direction	Direction input signal 0V = -VE direction



**Figure A1 – Digital Flow Input Circuit**

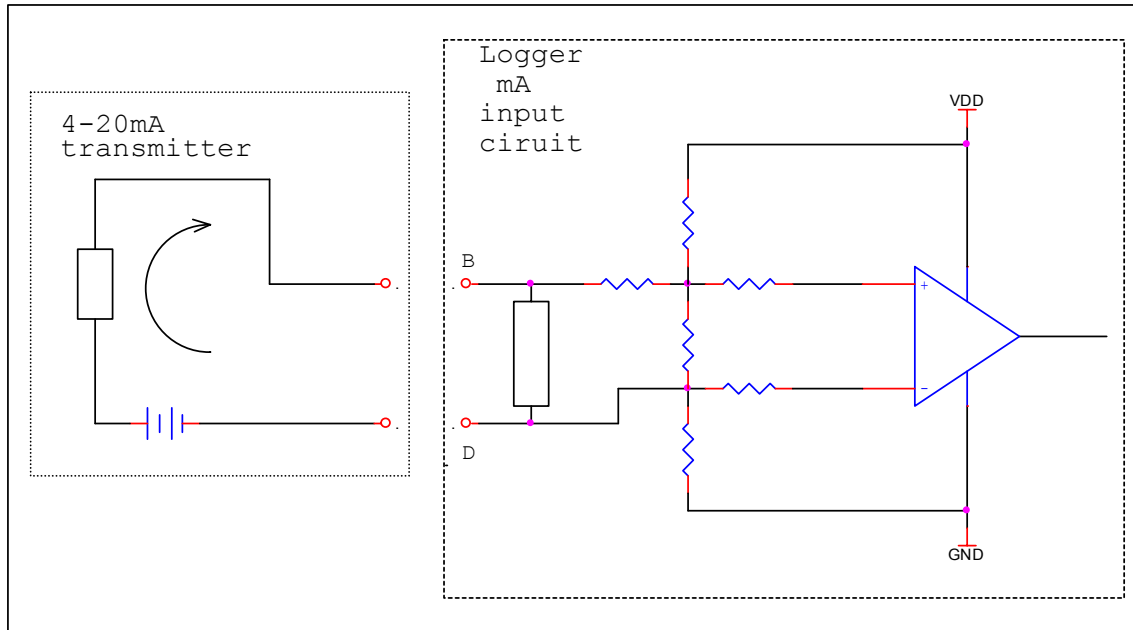
Typical colour coding used by Radcom loggers flow input cables:

Pin A - Red  
Pin B - Blue  
Pin C - Green  
Pin D - Yellow.

## MilliAmp Input

**Table A3 – Pin Connector Type 62GB57A-10-4**

Pin No.	Title	Description
A		
B	+VE signal	Positive mA input signal
C		
D	-VE signal	Negative mA input signal



**Figure A2 – MilliAmp Input Circuit**

## Annex B – Troubleshooting

**Table B1 – Trouble Shooting Guide**

Error	Possible Cause
'Time-out error' or 'No response from logger' whilst attempting communications between Lo Log and PC/PDA.	<p>Is the infra-red reader plugged securely into a comms port on the PC/PDA?</p> <p>Is the infra-red reader correctly located over the Lo Log's infra-red window?</p> <p>Is the software port setting correct?</p> <p>Is the software baud rate set to 9600?</p>
Download or Upload seems unreliable	<p>Is the infra-red reader plugged securely into the PC?</p> <p>Try another infra-red reader.</p> <p>Are there any 'background' programs (e.g. Sidekick) or TSRs (e.g. Power.Exe) loaded on your PC which could interfere with serial communications?</p> <p>Is a mouse driver loaded for this particular comms port?</p> <p>Is Radcom's logger alarm monitor RADINT installed for this particular comms port?</p> <p>If the disk caching program 'SMARTDRV.EXE' (or similar) is installed on your PC it may help if it is temporarily disabled (see your DOS manual).</p> <p>If your PC is connected to a network it may help to temporarily disable the connection.</p>
Logger records zeros	<p>Check connections for ingress of water or trapped moisture.</p> <p>Check sensor for correct operation.</p> <p>Check sensor lead.</p>
When downloaded, flow rate readings from the logger are unexpectedly negative.	<p>The meter/sensor combination is producing an output frequency that is too high. If possible, reduce the logger sample period or change the sensor to one with a lower resolution.</p>

## Annex C – Lo Log Calibration

This annex provides the information needed to calibrate the Radcom Lo Log data loggers connected by the IR Reader to the serial communication port. The annex provides a detailed description on the usage of the commands to calibrate, re-zero and check the individual channels of the logger. It also explains how the logger will respond to each command.

### WARNING

The calibration procedure must be carried out with great care, as it is possible to lose the existing calibration details stored inside the logger. It is recommended that only an experienced operator should carry out this operation.

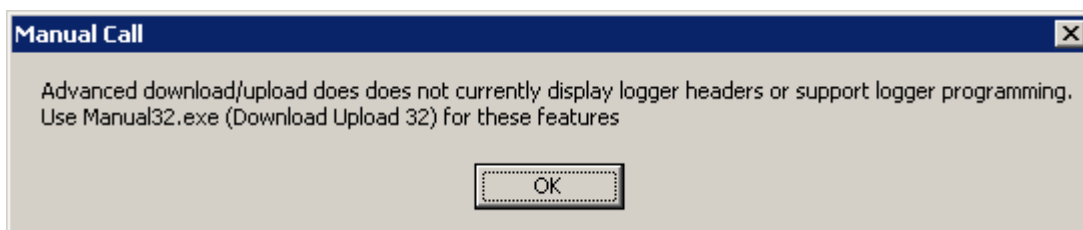
### C1. Logger Calibration

Select **Radcom Radwin Lite** from the start menu.

Make sure the communications port is configured correctly by selecting **Basic Configuration** from the **Configuration** drop-down menu

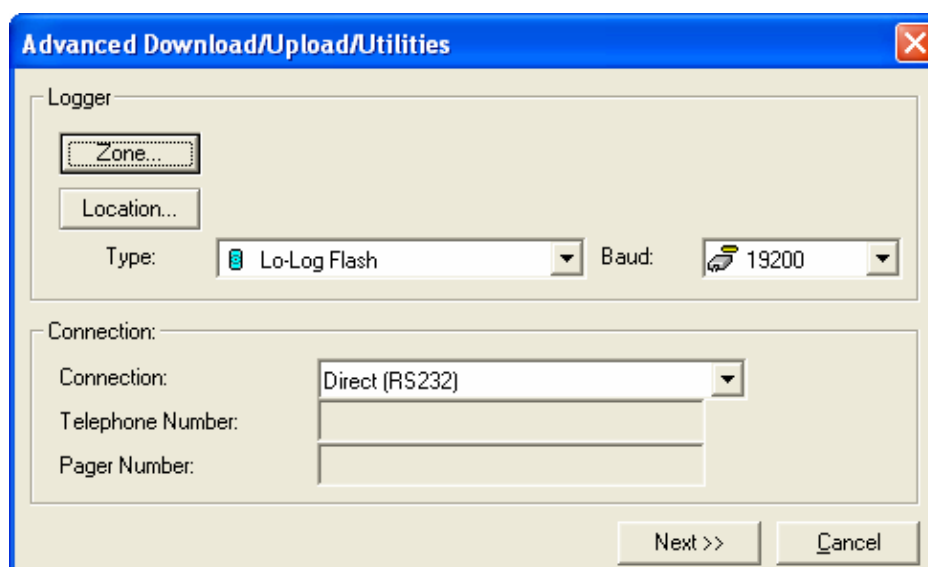
Select **Advanced Download/Upload/Utilities** from the Download Options drop-down menu.

Click on the **OK** button if the following message appears



On the **Advanced Download/Upload/Utilities** screen (see Figure C1 below):

- Check/change the Logger Zone and Location.
- Check/change the Logger Type to *Lo Log Flash* from the **Type** drop-down menu.
- Change the Baud Rate to the required setting (9600) using the **Baud** drop-down menu.
- Check/change the Connection type required (*Direct RS232*) using the **Connection** drop-down menu.

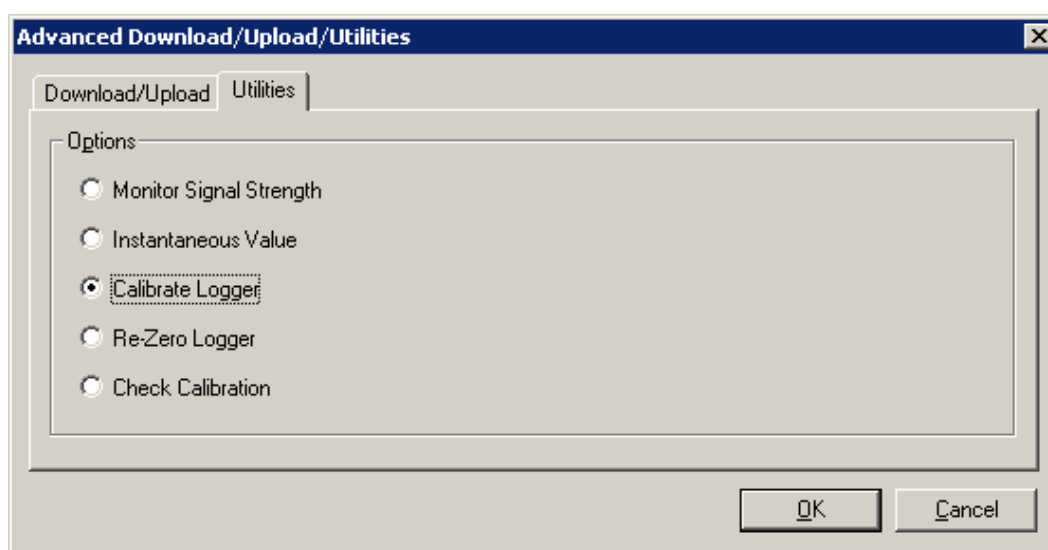


**Figure C1 – Advanced Download/Upload/Utilities Screen**

Click on the **Next** button.

Select the **Utilities** tab now shown on the **Advanced Download/Upload/Utilities** screen and click in the **Calibrate Logger** box (See Figure C2 below).

Click on the **OK** button.



**Figure C2 – Calibrate Logger, Utilities Tab, Advanced Download/Upload/Utilities**



The identification information of the logger will now download to the PC (see Figure C3).

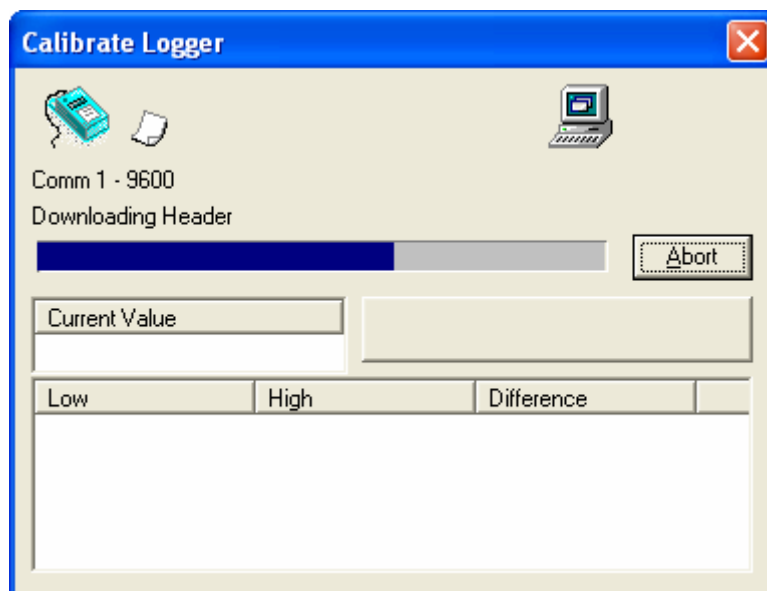


Figure C3 – Downloading Header Screen

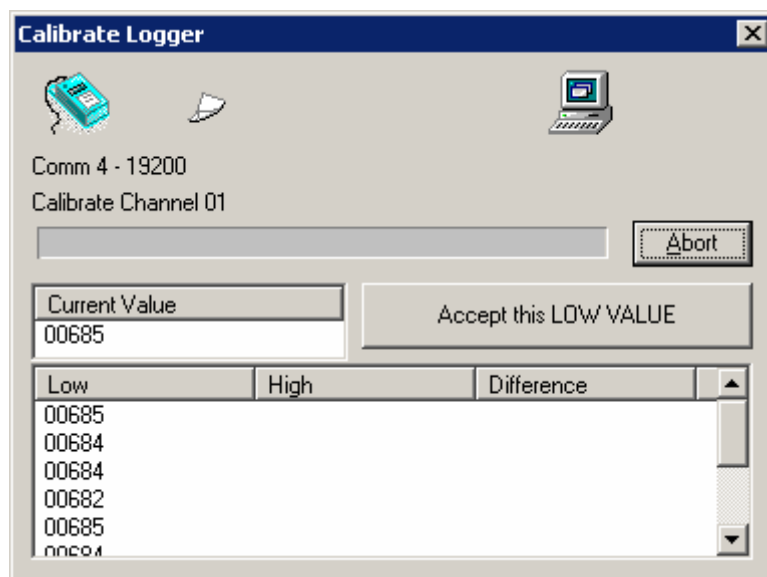
Click **Yes** to continue when the following message appears.



Apply a pressure of **0 Bar** to the data logger (equivalent to the transducer being open to the atmosphere).

The **Calibrate Logger** Screen opens (see Figure C4) and a flow of values will start to appear in the **Low** column. Allow the raw Numbers in the **Low** column to stabilize.

Click on the **Accept this LOW VALUE** button when the low figure values are acceptable.

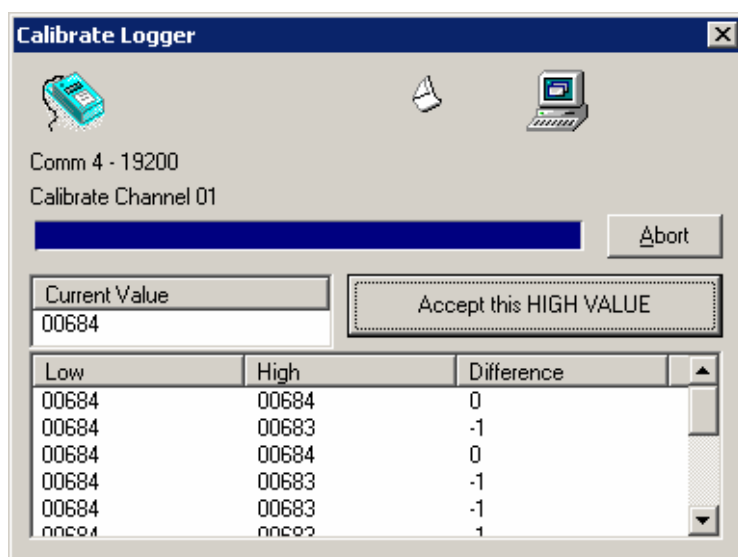


**Figure C4 – Low Value, Calibrate Logger Screen**

Apply a pressure of **10 Bar** to the Logger (assuming that the high pressure is set at 10 bar).

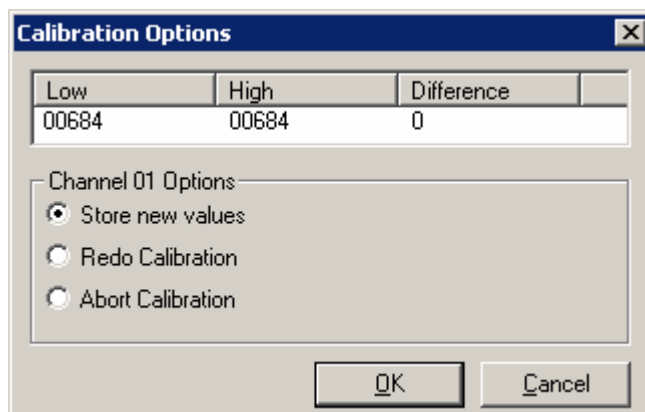
A flow of values will now appear in the High column of the **Calibrate Logger** screen (see Figure C5 below). The Raw values in the **High** columns should increase and be higher than the values in the **Low** column.

Click on the **Accept this HIGH VALUE** button when high figure values are acceptable.



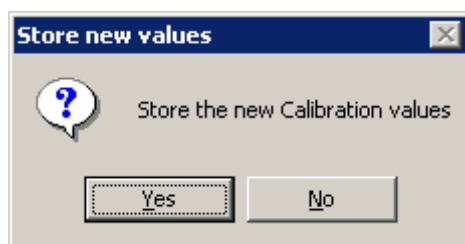
**Figure C5 – High Value, Calibrate Logger Screen**

The **Calibration Options** screen will then appear (see Figure C6) allowing the operator the choice of either storing, re-calibrating or aborting the logger calibration by clicking into the required **Channel Options** box and clicking on the **OK** button.



**Figure C6 – Calibration Options Screen**

If the **Store New Values** box is checked the **Store the new Calibration Values** screen appears. Click on the **YES** button to store the values.



## C2. Re-Zero

Open the **Advanced Download/Upload/Utilities** screen using the procedures from the **Logger Calibration** section (see Clause C1).

Click in the **Re-Zero Logger** box and click on the **OK** button.

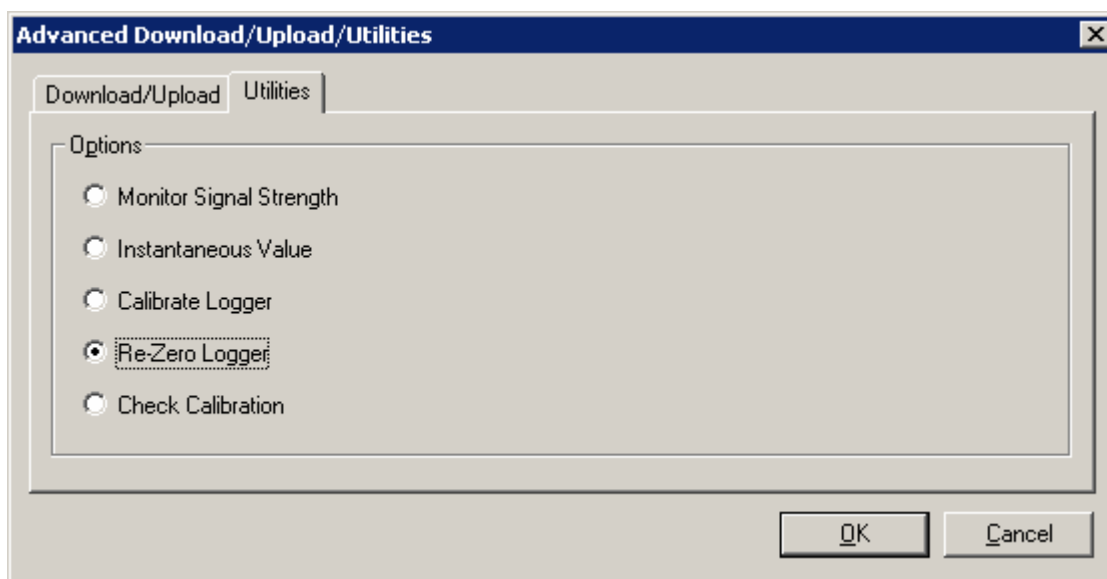


Figure C7 – Re-Zero Logger, Utilities Tab, Advanced Download/Upload/Utilities

The identification information of the logger will now download to the PC.

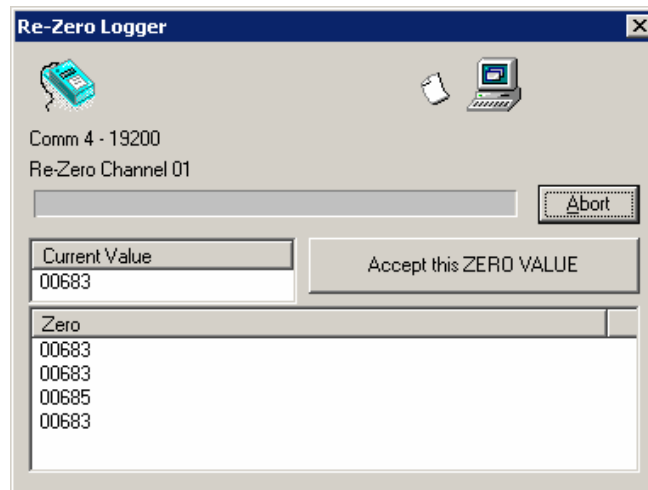
Click **Yes** to continue when the following message appears.



A flow of values will then appear in the **Zero** column of the **Re-Zero Logger** screen. Allow the raw Numbers in the **Zero** column to stabilize (see Figure C8 below).

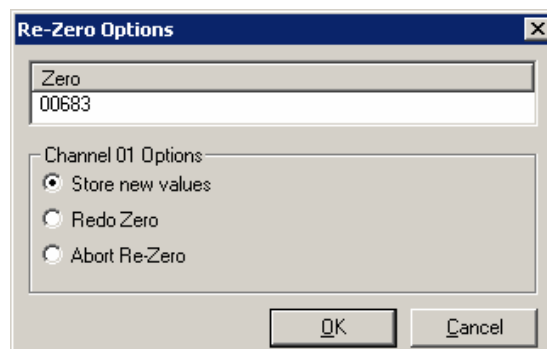
Click on the **Accept this ZERO VALUE** button when the Zero figure values are acceptable.

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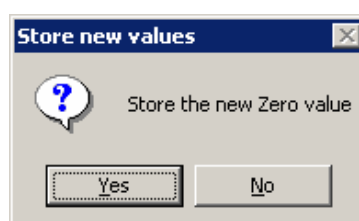
**Figure C8 – Re-Zero Logger Screen**

The **Re-Zero Options** screen will then appear (see Figure C9 below) allowing the operator the choice of either storing, re-zeroing or aborting the Re-Zero by clicking into the **Channel Options** box and clicking on the **OK** button.



**Figure C9 – Re-Zero Options Screen**

If the **Store New Values** box is checked the **Store the new Zero Value** screen appears. Click on the **YES** button to store the values.



### C3. Check Calibration

Open the **Advanced Download/Upload/Utilities** screen using the procedures from the **Logger Calibration** section (see Clause C1).

Click in the **Check Calibration** box and then click on the **OK** button (see Figure C10).

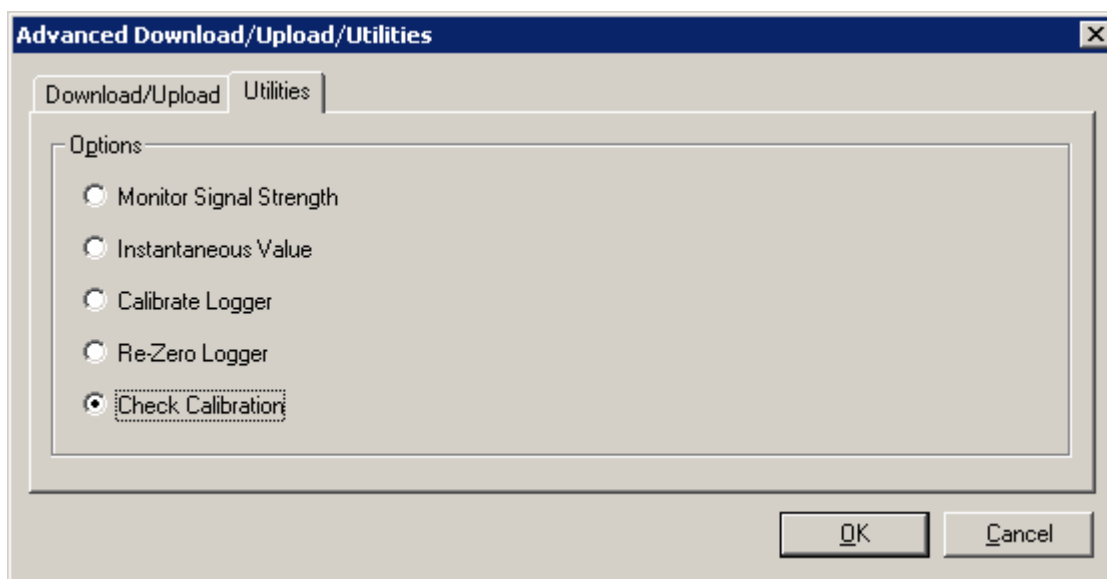


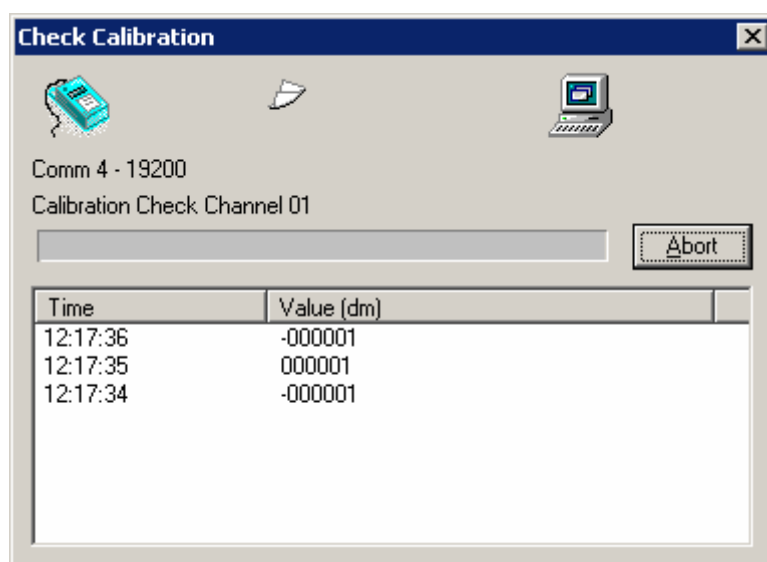
Figure C10 – Check Calibration, Utilities Tab, Advanced Download/Upload/Utilities

The identification information of the logger will now download to the PC.

Click **Yes** to continue when the following message appears.

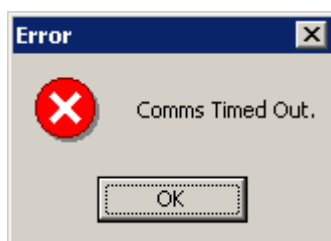


A flow of values will then appear in the **Time** and **Value** columns of the **Check Calibration** screen. Allow the raw Numbers in the **Value** column to stabilize (see Figure C11 below).

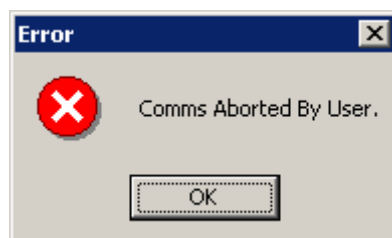


**Figure C11 – Check Calibration Screen**

If the test is left to run the following **Comms Timed Out** error screen will eventually appear.



If the operator clicks on the **Abort** button the following **Comms Aborted by User** error screen will appear.



Click on the **OK** button to return to the **Utilities** tab on the **Advanced Download/Upload/Utilities** screen.

The operator can then re-calibrate or Re-Zero if the values are unacceptable.

## Annex D – Instantaneous Values of the Logger Input

Measurements being taken by the data logger can be viewed in real time using the Radwin Lite software.

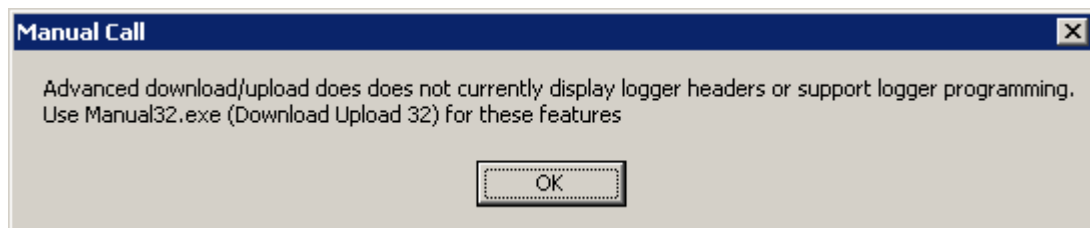
To view Instantaneous Values from the logger, proceed as follows:

Select **Radcom Radwin Lite** from the start menu.

Make sure the communications port is configured correctly by selecting **Basic Configuration** from the **Configuration** drop-down menu

Select **Advanced Download/Upload/Utilities** from the Download Options drop-down menu.

Click on the **OK** button if the following message appears



On the **Advanced Download/Upload/Utilities** screen (see [Figure D1](#) below):

- Check/change the Logger Zone and Location.
- Check/change the Logger Type to *Lo Log Flash* from the **Type** drop-down menu.
- Change the Baud Rate to the required setting (9600) using the **Baud** drop-down menu.
- Check/change the Connection type required (*Direct RS232*) using the **Connection** drop-down menu.



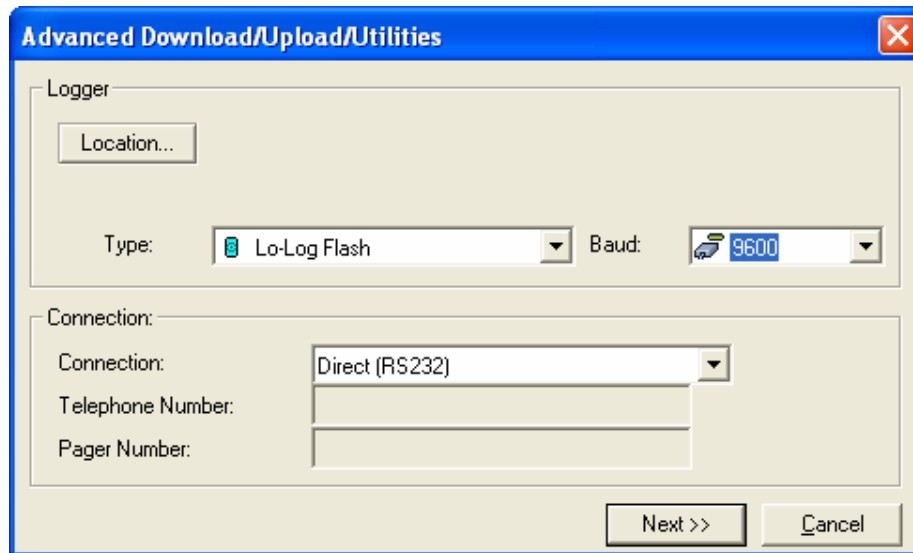


Figure D1 – Advanced Download/Upload/Utilities Screen

Click on the **Next** button.

Select the **Utilities** tab now shown on the **Advanced Download/Upload/Utilities** screen and click in the **Calibrate Logger** box (See Figure D2 below).

Click on the **OK** button.

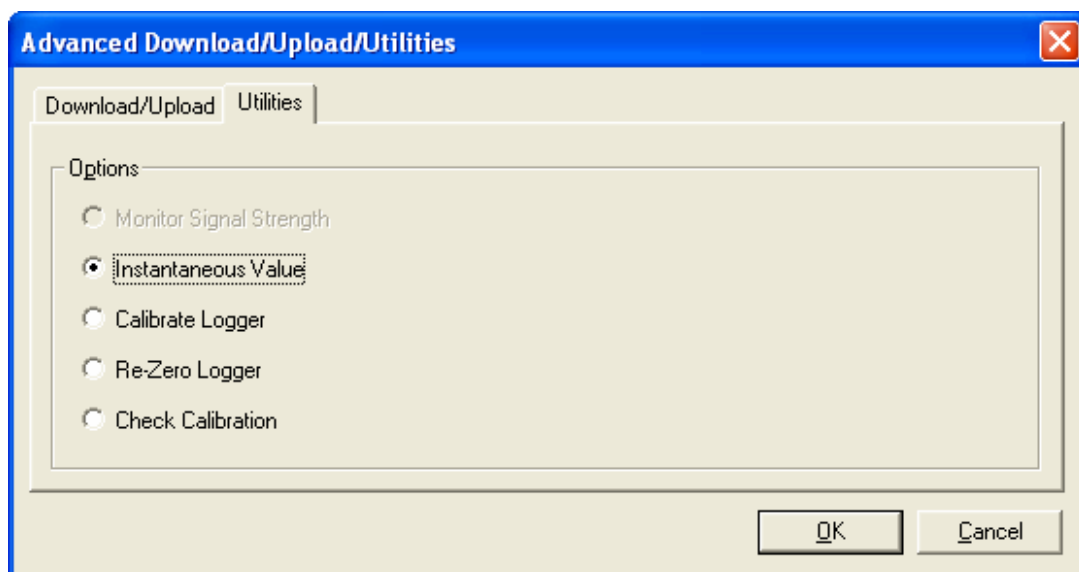
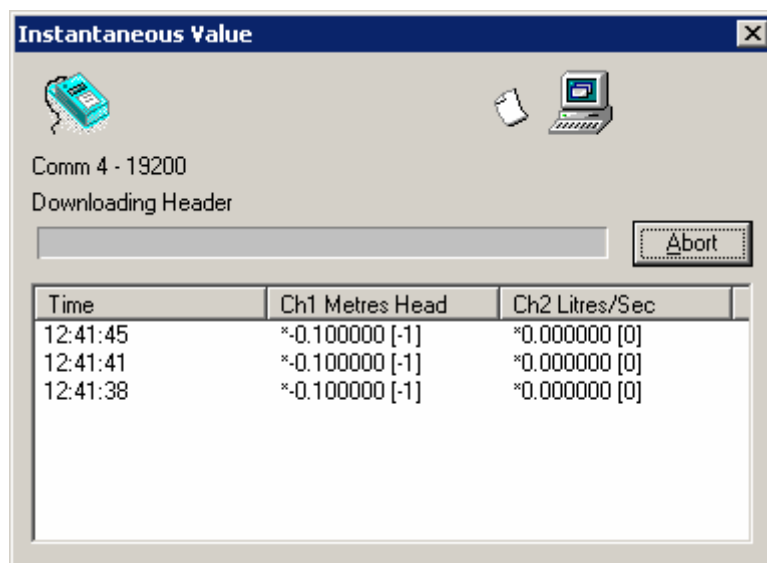


Figure D2 – Instantaneous Values, Utilities Tab, Advanced Download/Upload/Utilities

The **Instantaneous Value** screen will now appear showing the channel values being read by the logger (see Figure D3 below).

**Note**

The readings for the channels shown are *Metres Head* and *Litres per second*, normal readings will depend on the input signal type and transducer configuration details.

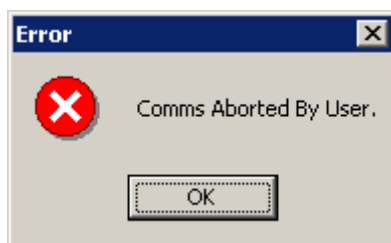


**Figure D3 – Instantaneous Value Screen**

If the readings are left to run the following **Comms Timed Out** error screen will eventually appear.



If the operator clicks on the **Abort** button the following **Comms Aborted by User** error screen will appear.



Click on the **OK** button to return to the **Utilities** tab on the **Advanced Download/Upload/Utilities** screen

## **Annex E – Meter Types**

The Lo Log Data Loggers can be supplied in a format enabling it to be connected directly to an ABB Water Meters Ltd water meter.

The REV418L model has a hall-effect sensor mounted onto the logger that clamps onto the meter register using a special adaptor.

Compatible meter models are - KVM™, MSM™, V210™ or V200™.

For more information on this model contact Radcom Technologies Ltd.

Telephone No. +44 (0) 1794 528700 or

Website [www.radcom.co.uk](http://www.radcom.co.uk)

E-mail [sales@radcom.co.uk](mailto:sales@radcom.co.uk)